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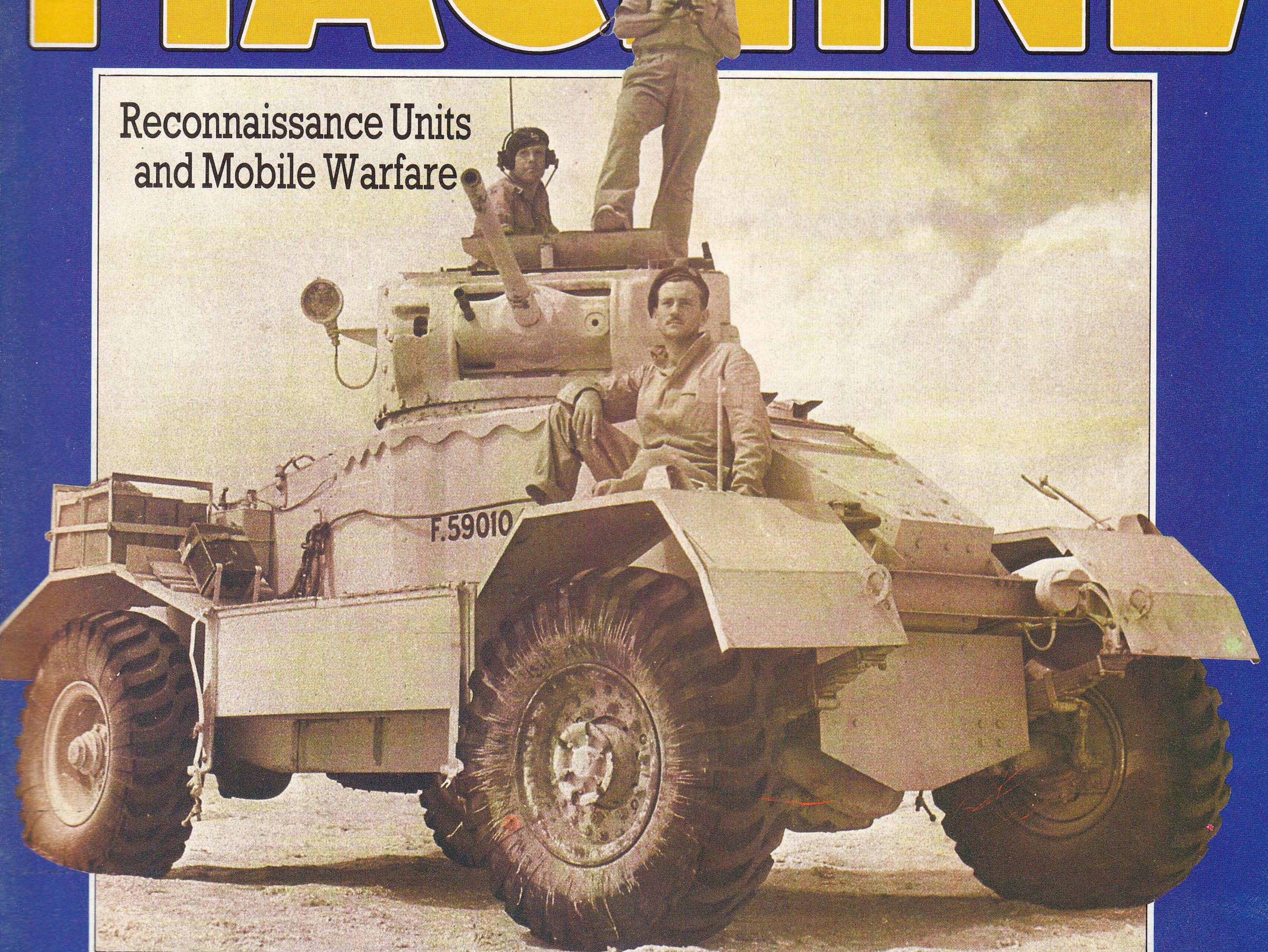

Reconnaissance Units and Mobile Warfare

Allied Reconnaissance Units from D-Day to Berlin

German Armoured Cars in Action

Armed Forces of the World: Egypt

A fully illustrated guide to Armoured Cars of World War II

WAR MACHINE

Volume 3 **Issue 33**

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Armed Forces of the World

Egypt iii

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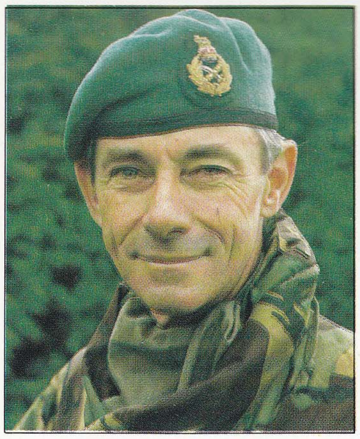

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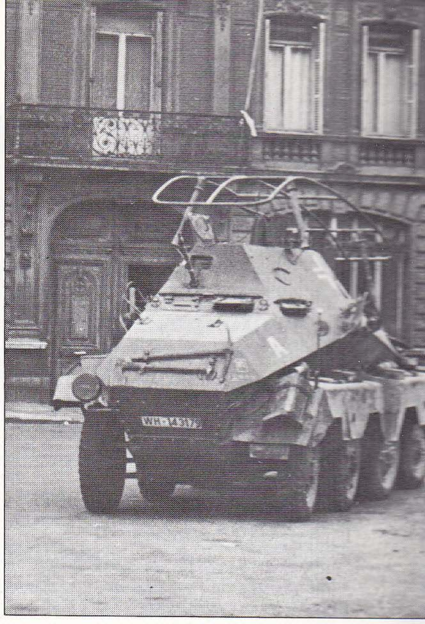
Air-to-air Missiles
Assault Helicopters

Armoured Cars of World War 11

Battles are often won as a result of a commander having more accurate information than his opponent. For a long time, such battlefield information was provided by the cavalry, but in the fast-moving mechanized war of 1939-45 it was the armoured car that operated on many fronts, ranging far ahead of their parent formations.



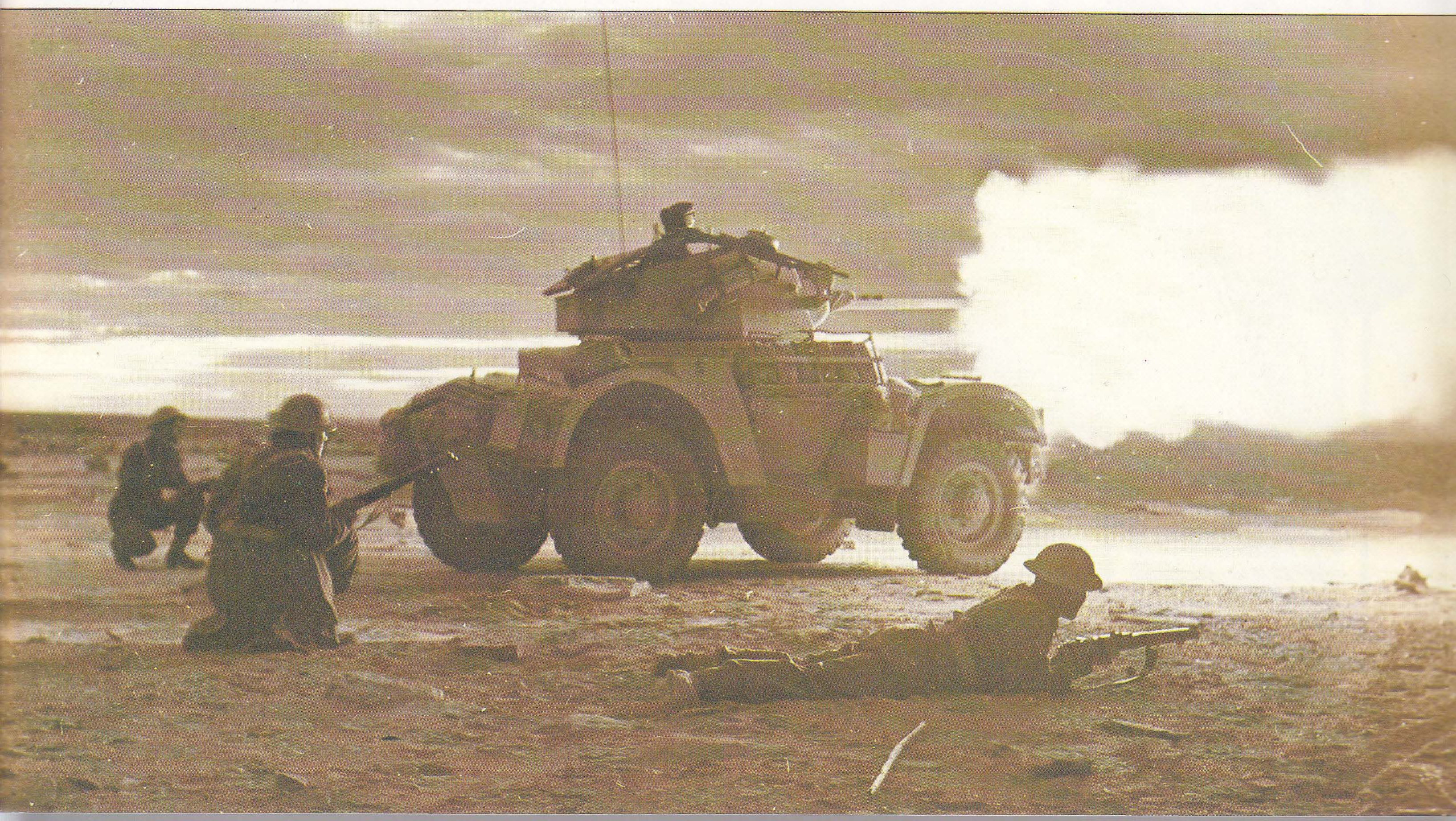
To ensure that reconnaissance information got through to the commander, the Germans developed special armoured cars. The German Panzerfunkwagen 263 had a fixed superstructure and carried a large fixed radio antenna.

The armoured car today retains a niche in modern armoured warfare largely unchanged from the early days of World War II: a primary function of scouting and reconnaissance. It has this role because it is generally much faster and handier to employ than the more ponderous tank, though the armoured car pays for these attributes by being relatively thinly armoured and lightly armed, if it does possess any armament at all. In short, the armoured car has to rely on speed and manoeuvrability to survive, but its reconnaissance role is a vital one as modern armoured and infantry formations cannot operate without knowing what is going on 'on the other side of the hill'.

By 1939 the armoured car had settled down to an established form. It usually had a 4×4 drive configuration, although many larger designs had as many as eight wheels on four axles, and it was usually purpose-built. This did not prevent extemporized designs such as the early South African Marmon Herringtons from providing excellent service, but generally speaking most armoured cars were designed for their job and were not the hurried conversions from commercial chassis that were the general rule in World War I. The type's role had also been formalized, and by 1939 the armoured car and the little scout cars were an integral part of the reconnaissance structure of virtually every type of operational structure from the German Panzer division to the ordinary infantry division.

It would be safe to say that the armoured car units had a relatively free and easy war. Their casualties were often heavy, but in general they enjoyed the benefits of operating well away from the formal methods and organizational structure of the rest of their army, and they were thus able to employ their own initiative and tactics in a way that was impossible in most other units. They ranged far and wide, sometimes took part in spectacular raids and generally took the battle to the enemy, but in all armies their primary function was reconnaissance. Their success was not measured in casualties and combat but in the quality and accuracy of the information and intelligence they were able to pass back to the rear. Their armament was primarily defensive, and although such superlative fighting vehicles as the Puma and M8 Greyhound were put in service, it should be borne in mind that perhaps the most successful of the vehicles covered was the little Daimler scout car, a vehicle type that survives to this day in the British Ferret reconnaissance vehicle.

A Daimler armoured car opens fire with its main 2-pdr gun during the initial stages of the final advance on Tripoli in 1943. This photograph is unusual in that the Daimler is seen in support of infantry, a role it does not normally assume. The 2-pdr gun had only a very limited capability in such roles, as it fired a solid shot only.



Reconnaissance Units and Mobile Warfare

The Duke of Wellington once said that he had spent his whole life 'guessing what was on the other side of the hill'. A successful commander needs to know the mind of his enemy and his dispositions and, in modern mobile warfare, as much as possible about the ground his forces are to move over – hence the importance of effective reconnaissance.

In warfare there are several types of reconnaissance, but in practice they can be reduced to three main categories: at the head of this listing is strategic or operational reconnaissance, then comes tactical reconnaissance, and at the end of the chain is battle reconnaissance.

Operational or strategic reconnaissance is a topic that deals mainly with the larger aspects of warfare, such as the disposition of armies rather than divisions, and the likely major supply routes (railways, etc). This is mainly a matter for such activities as radio interceptions at high command levels, aerial reconnaissance on a large scale, and economic appreciations; in short, it is not an intelligence level with which armoured car units have an everyday involvement. However, the two lower levels are frequently ones in which armoured units can find themselves involved; tactical reconnaissance is undertaken at command levels down to that of division or even lower.

Battle reconnaissance is a term that tends to speak for itself and it is something with which every tactical unit at every level should be employed, for it deals with the reconnaissance of definite objectives within the immediate operational area. Here again armoured car and other reconnaissance units can become involved, but it must be mentioned that battle reconnaissance concerns several separate aspects, such as pure terrain reconnaissance down to special patrols and battlefield patrols intended to probe enemy strengths and units.

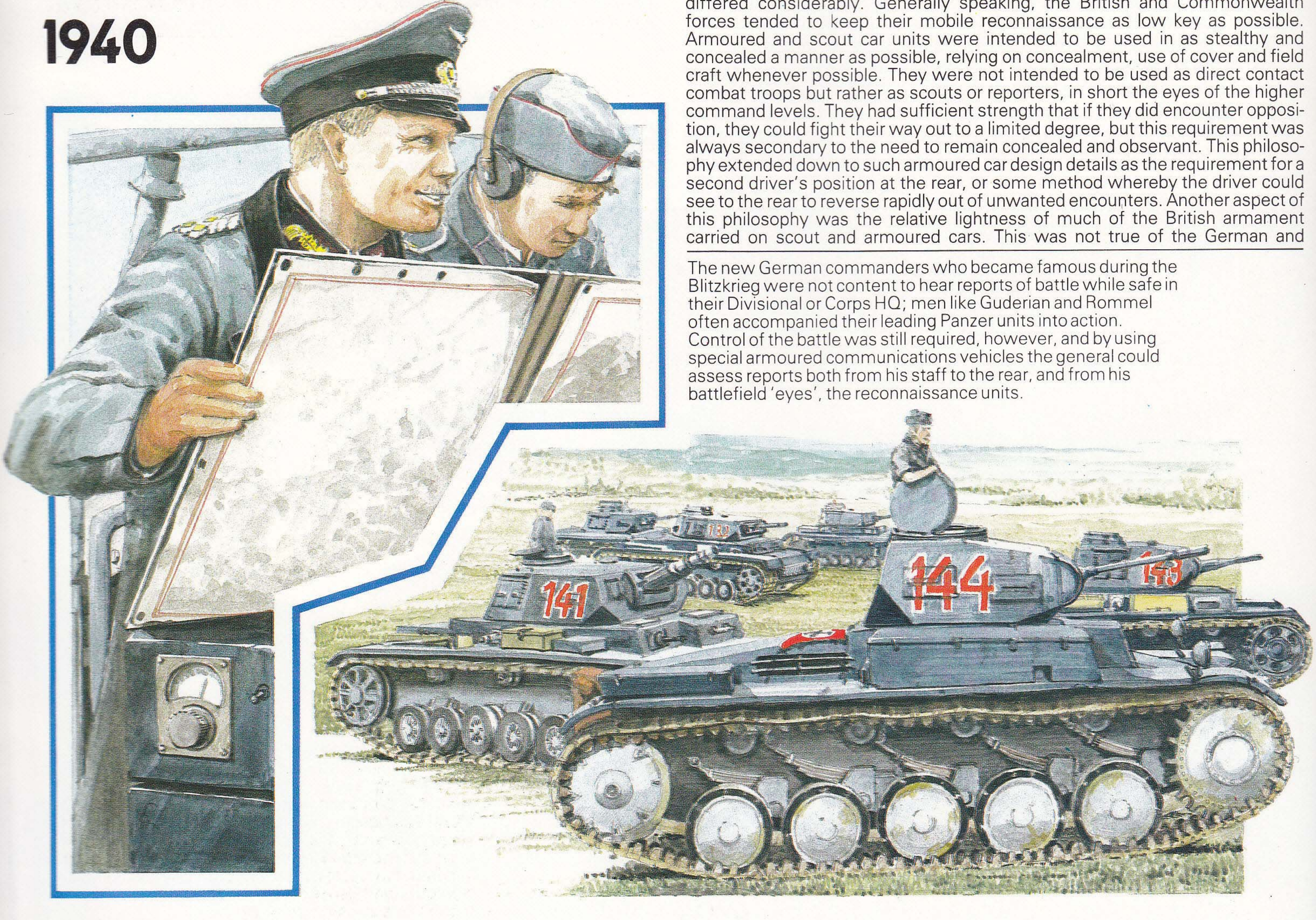
Tactical reconnaissance is perhaps the most important part of the armoured car units' tasks, for it involves scouting ahead of one's own forces and positions and determining the path of an advance by probing the strengths and weaknesses of the enemy. Much of the time is spent assessing the strengths and composition of obstacles, defensive belts and such mobility-blocking measures as anti-tank defences. Passing the information thus gained back to the main body allows them valuable preparation time to get ready to meet the particular difficulties. It is an old staff college saw that 'time spent in reconnaissance is rarely wasted', but the higher up the command chain one goes the more distant and remote the reconnaissance results become. Thus an army commander has to rely on information that is frequently somewhat old and is sifted through several channels. Modern communications have largely eliminated many of the bottlenecks that restricted the commanders on all sides during World War II, in which many resourceful commanders such as Rommel short-circuited the reconnaissance report bottleneck by riding forward with the reconnaissance units. Such measures were and still are extreme, but their existence provides a vivid indication of the priority that some commanders gave to quality intelligence from reconnaissance.

Similar aims, different methods

During World War II all units up to divisional level had at least one battalion or equivalent-sized unit that dealt entirely with reconnaissance. The British even began a formation known as the Reconnaissance Corps to deal with this subject, but the corps, although it provided sterling service and results on many occasions, was merely a method to expand upon resources that already existed within the normal operational unit structure, in which each armoured and infantry division had its own integral reconnaissance regiment (or battalion). The German Panzer division had its own integral battalion, and so did the Soviet mechanized and armoured divisions (although their units were more dispersed throughout the divisional organization). The American reconnaissance arrangements were similar to those of the British and Germans.

Thus it would seem that the reconnaissance methods employed by all the protagonists during World War II were similar, but in practice their philosophies differed considerably. Generally speaking, the British and Commonwealth forces tended to keep their mobile reconnaissance as low key as possible. Armoured and scout car units were intended to be used in as stealthy and concealed a manner as possible, relying on concealment, use of cover and field craft whenever possible. They were not intended to be used as direct contact combat troops but rather as scouts or reporters, in short the eyes of the higher command levels. They had sufficient strength that if they did encounter opposition, they could fight their way out to a limited degree, but this requirement was always secondary to the need to remain concealed and observant. This philosophy extended down to such armoured car design details as the requirement for a second driver's position at the rear, or some method whereby the driver could see to the rear to reverse rapidly out of unwanted encounters. Another aspect of this philosophy was the relative lightness of much of the British armament carried on scout and armoured cars. This was not true of the German and

Panzer Reconnaissance 1940



The new German commanders who became famous during the Blitzkrieg were not content to hear reports of battle while safe in their Divisional or Corps HQ; men like Guderian and Rommel often accompanied their leading Panzer units into action. Control of the battle was still required, however, and by using special armoured communications vehicles the general could assess reports both from his staff to the rear, and from his battlefield 'eyes', the reconnaissance units.

American equipments, which were generally armed with heavy weapons from the outset: at the beginning of the war most British armoured cars were limited to machine-guns, while American equivalents were armed with at least a 37-mm cannon. While the Germans later upgunned their armoured cars to 50-mm (1.97-in) and even short 75-mm (2.95-in) tank guns, the British tended to stick to their 2-pdr gun with a 40-mm (1.575-in) calibre, and only a relatively few vehicles were equipped with 6-pdr (57-mm/2.244-in) guns, 76.2-mm (3-in) howitzers or 75-mm (2.95-in) guns. These latter were used for fire support of the lightly armed vehicles when necessary.

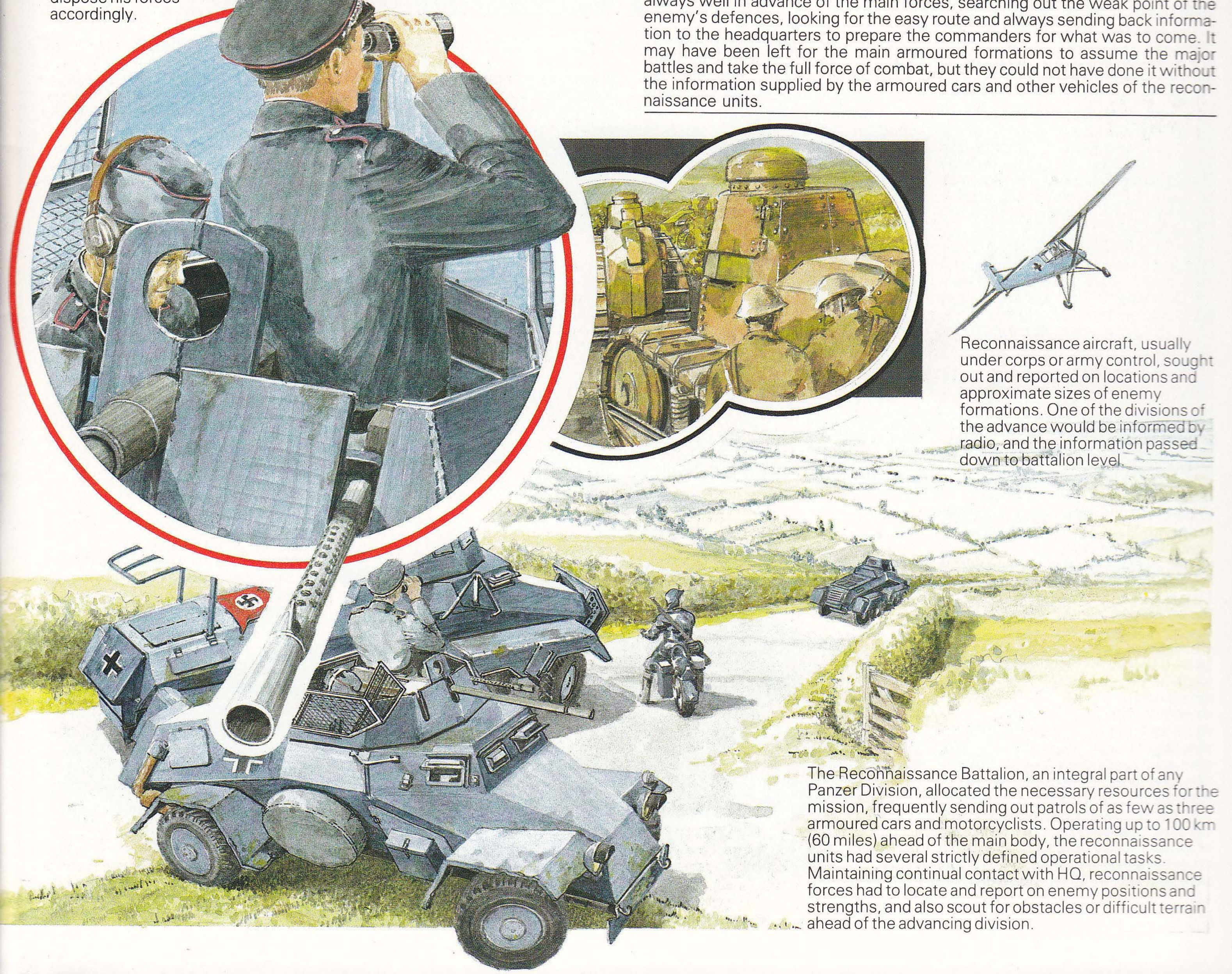
Soviet practice

The Soviets started their 'Great Patriotic War' with some armoured cars, but following the occupation of huge tracts of their territory and most of their manufacturing facilities by the Germans in 1941 and 1942, they accorded the armoured car a low production and development priority. Thus after 1942 the Red Army reconnaissance units had to use whatever they had to hand, and for much of the time this meant the T-34 tank. Thus tanks acted as reconnaissance vehicles for tanks. Some units were issued with light tanks such as the T-60, and a few units used the little BA-64 armoured car for reconnaissance, but most units had to rely on the T-34. This in fact exactly suited the massed tactics of the Red Army after the Stalingrad battles of late 1942 and early 1943, when the tactical and strategic initiative had passed to the Soviets: the use of ordinary tanks enabled them to keep specialized logistic and other supply requirements to a minimum. Ranging far ahead of the massed Red Army tank units, small units of T-34s could still carry out their reconnaissance functions while maintaining a considerable defensive and offensive potential with their 76-mm (3-in) main guns and thick armour.

Much of the above deals with tactical reconnaissance, but the more direct battle reconnaissance must not be neglected, for it often involved the use of armoured cars down to quite low levels of command. It was not unusual in nearly all armies involved in World War II for small units of armoured or scout cars to be attached to tank companies to carry out local scouting. This was very often carried out with a unit commander riding in one of the forward scout vehicles. This practice became established in many Allied tank formations where a battalion or company headquarters had at least one scout or armoured car; scout cars were thus widely issued for this purpose in the British and Commonwealth armies. The Americans preferred M8 light armoured cars or M20 utility vehicles for the same role with their armoured and tank destroyer battalions, while the Germans were frequently forced by equipment shortages to use any vehicle that was available. This could include such vehicles as captured Soviet equipments or even completely unarmoured and unarmed light vehicles such as Volkswagen utility cars.

Battlefield reconnaissance apart, most reconnaissance units involved with armoured units operated well in advance of the main body. The 'paper' interval between the main force and the reconnaissance units was supposed to be one day's march, but at times this interval of about 25 km (15 miles) was frequently exceeded by a considerable margin. The first instance of this occurred during the German advance from the Meuse to the Channel coast in May 1940, when the far-flung advances of the German Panzer reconnaissance units frequently jeopardized the whole operation when high-level staff officers understandably became alarmed by the fact that armoured cars were operating over 100 km (60 miles) distant from the main body of Panzer battalions. Later in the war similar gaps emerged during combat in the Soviet Union, but after the end of 1942 the advances of the Red Army made such heady operations a thing of the past. Reconnaissance units became much more tied to the defensive Panzer tail, and in 1944 it became the prerogative of the American and Soviet forces to range far and wide into enemy rear areas. The Americans in particular developed a flair for far-flung scouting raids into enemy territory, especially during Patton's advances from the Seine in late 1944 (until fuel supplies ran out). The British had their mad dash towards Brussels and the Rhine in 1944, while the Red Army seemed to be advancing all the time during 1943, 1944 and 1945. Reconnaissance units were always well in advance of the main forces, searching out the weak point of the enemy's defences, looking for the easy route and always sending back information to the headquarters to prepare the commanders for what was to come. It may have been left for the main armoured formations to assume the major battles and take the full force of combat, but they could not have done it without the information supplied by the armoured cars and other vehicles of the reconnaissance units.

Having located the enemy, the reconnaissance force reported back to higher command. The divisional commander could then dispose his forces accordingly.

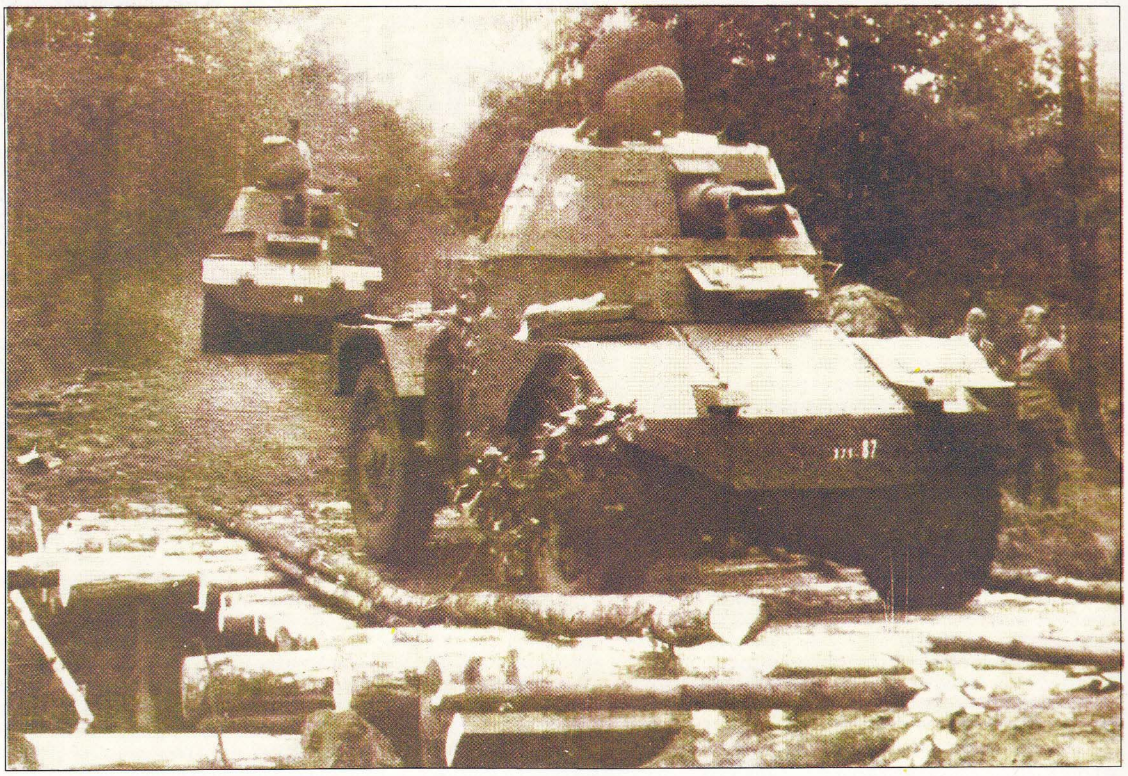


Reconnaissance aircraft, usually under corps or army control, sought out and reported on locations and approximate sizes of enemy formations. One of the divisions of the advance would be informed by radio, and the information passed down to battalion level.

The Reconnaissance Battalion, an integral part of any Panzer Division, allocated the necessary resources for the mission, frequently sending out patrols of as few as three armoured cars and motorcyclists. Operating up to 100 km (60 miles) ahead of the main body, the reconnaissance units had several strictly defined operational tasks. Maintaining continual contact with HQ, reconnaissance forces had to locate and report on enemy positions and strengths, and also scout for obstacles or difficult terrain ahead of the advancing division.

FRANCE

Automitrailleuse Panhard et Levassor Type 178



Two Automitrailleuse Panhard et Levassor Type 178s are seen here in German service following the fall of France in 1940. The Germans found these vehicles good enough for them to take into their own service, and many were used for anti-partisan operations in the USSR.

The **Automitrailleuse Panhard et Levassor Type 178** armoured car was first produced in 1935, and was developed from a design known as the **TOE-M-32**, which was intended for use in the French North African colonies and mounted a short 37-mm turret gun. Panhard used this design as a basis for a new French army requirement but gave the new vehicle a 4×4 drive configuration and moved the engine to the rear of the vehicle. The result was the Panhard 178 and the armament varied from a single 25-mm cannon on some vehicles to two 7.5-mm (0.295-in) machine-guns on others, while some command vehicles had extra radios but no armament. The Panhard 178 was known also as the **Panhard Modèle 1935.**

The Panhard 178 was put into production for the French infantry and cavalry formation reconnaissance groups. Production was slow, but by 1940 there were appreciable numbers available for the fighting which followed the German invasion in May. Many of the Panhard 178s were in widely scattered units and were unable to take much part in the fighting that ensued, so many were seized intact by the victorious Germans. The Germans liked the sound design of the Panhard 178 and decided to take it into their own service as the **Panzerspähwagen P 204(f)**, some of them being rearmed with 37-mm anti-tank guns and/or German machine-guns. Some of these were retained for garrison use in France, but others were later sent to the USSR, where the type was used for behind-the-lines patrol duties against Soviet partisans. Some were even converted for railway use, having their conventional wheels changed to railway wheels, and many of these 'railway' conversions were fitted with extra radios and prominent frame aerials.

Perhaps the most unusual use of the Panhard 178s took place in 1941 and 1942, when 45 vehicles, hidden from the Germans by French cavalry units following the defeat of 1940, were prepared by Resistance personnel for possible use against the Germans. These vehicles had no turrets, but these were manufactured under the nose of the Germans and fitted with 25-mm or 47-mm guns and/or machine-guns. The armoured cars were then secretly distributed throughout centres of resistance mainly in unoccupied France, where many were subsequently taken over by the German forces when they took over the unoccupied areas of France in November 1942.

After the Liberation the Panhard 178 was once more put into production during August 1944 at the Renault factory outside Paris. These new vehicles had a larger turret with a 47-mm gun, and were later known as the **Panhard 178B**. The new vehicles were issued to the new French cavalry units and were used for many years after 1945. Some saw action in Indo-China, and it was not until 1960 that the last of them was taken out of service.

Specification

Panhard 178

Crew: 4

Weight: (in action) 8.5 tonnes

Dimensions: length overall 4.79 m (15 ft 8½ in); width 2.01 m (6 ft 7¼ in); height 2.31 m (7 ft 7 in)

Powerplant: one 6.33-litre water-cooled petrol engine developing 105 bhp (78 kW)

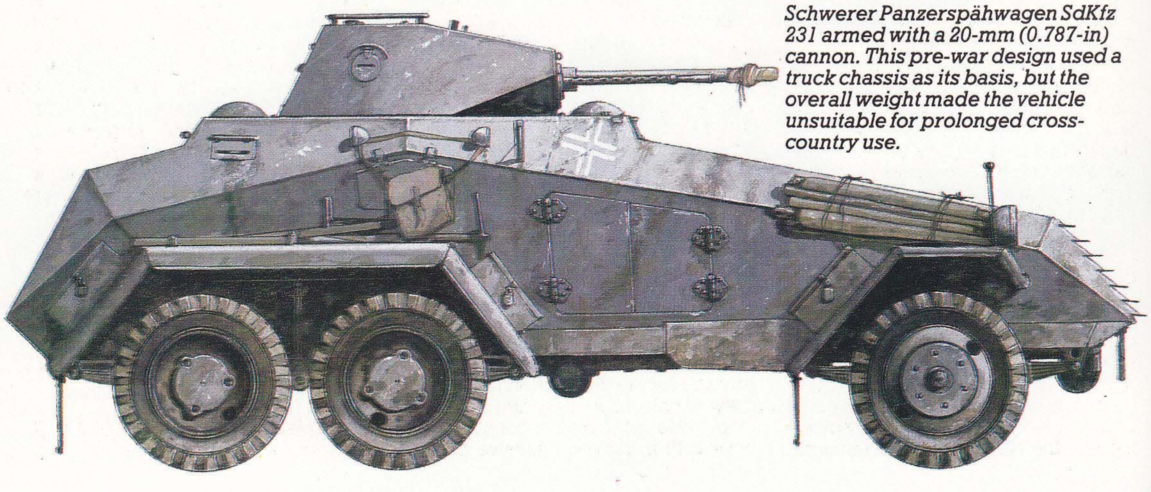
Performance: maximum road speed 72 km/h (45 mph); road range 300 km (186 miles); fording 0.6 m (1 ft 11½ in); gradient 40°; vertical obstacle 0.3 m (11¾ in); trench 0.6 m (11¾ in)

GERMANY

schwerer Panzerspähwagen SdKfz 231

The **schwerer Panzerspähwagen SdKfz 231** 6×4 heavy armoured car had its origins at the Kazan test centre established in the Soviet Union during the 1920s. There the German automobile industry developed an 8×8 armoured car chassis that proved to be too expensive for further development, so a 6×4 chassis was tried instead. This model used a truck chassis as its basis, and originally this was a Daimler-Benz product but later Büssing-NAG and Magirus chassis and engines were employed. These chassis were fitted with suitable armoured hulls and turrets, and modifications were made to allow steering from either end of the hull. Early trials demonstrated the need for stronger front axles and revised radiators, and the resulting vehicle was issued to German army units during 1932. Production continued until 1935, by which time about 1,000 had been produced.

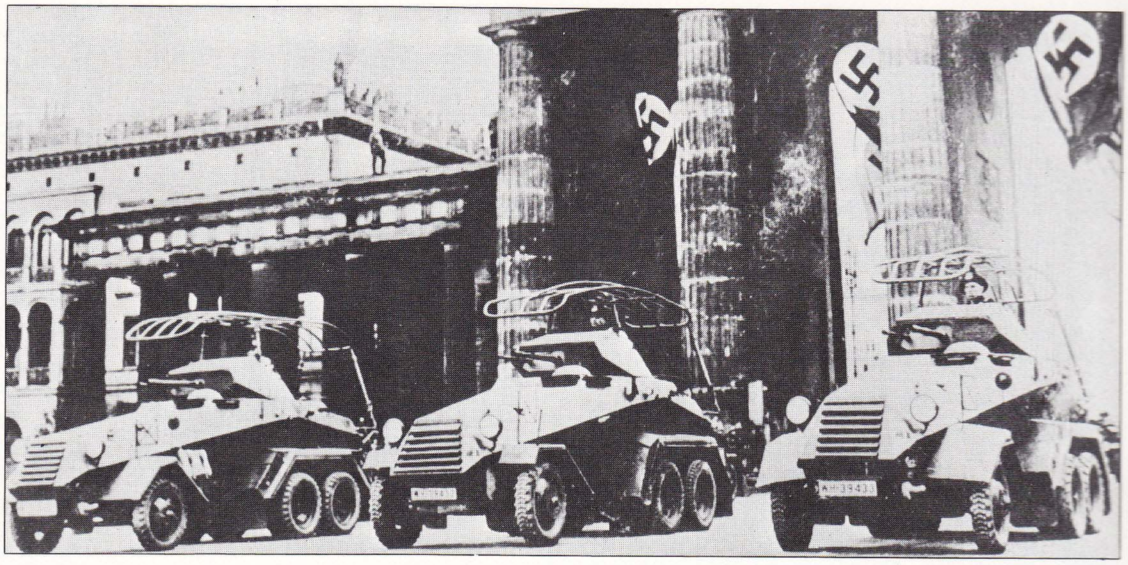
The 6×4 armoured cars were not a great success but they were produced at a time when the German army lacked experience in the use of armoured vehicles, and were thus invaluable as training and preparation equipments. Using lorry chassis carrying armoured hulls that were really too heavy for their supporting structures, the six-wheeled armoured cars were underpowered and had only limited cross-country capabilities. But when used on roads they were as good as anything else available, and they were used to good effect during the occupations of Austria and Czechoslovakia during 1938 and 1939, and were also used in combat in Poland and France. Their very appearance had great propaganda impact, and they were accordingly given great media coverage at the time. After 1940 they gradually faded from front-line use and were relegated



Schwerer Panzerspähwagen SdKfz 231 armed with a 20-mm (0.787-in) cannon. This pre-war design used a truck chassis as its basis, but the overall weight made the vehicle unsuitable for prolonged cross-country use.

mainly to training roles.

Early examples of the six-wheeled armoured cars had provision for only one 7.92-mm (0.31-in) MG 34 machine-gun in the turret, but the version used mainly by the heavy platoons of the German army motorized units was the SdKfz 231. This had a turret mounting a 20-mm cannon, originally the KwK 30 but later the KwK 38 with a higher rate of fire. Mounted co-axially with this cannon was a 7.92-mm (0.31-in) MG 34, and there was provision for an anti-aircraft machine-gun on the turret roof. The SdKfz 231 was used as a tactical vehicle (undertaking a combat role in direct fire support of motorized infantry units mounted on trucks or later on halftracks), but at times it was also used in support of light reconnaissance units for Panzer formations. Another vehicle that was very similar to the SdKfz 231 was the **SdKfz 232**, which was basically a Sdkfz 231 fitted with a long-range radio set that required the fitting of a large and prominent frame aerial above the turret and over the hull rear, the turret acting as a support for the forward part of the aerial. Another similar vehicle was the **SdKfz 263**, which also had a large frame aerial, though on this vehicle the turret was fixed and had provision for a single machine-gun only. The SdKfz 263 was used as a command vehicle.



Schwerer Panzerspähwagen SdKfz 232s seen during a pre-war parade in Berlin. These vehicles were equipped with a large and cumbersome radio antenna mounted over the turret which remained static while the turret rotated.

Specification

SdKfz 231

Crew: 4

Weight: (in action) 5.7 tonnes

Dimensions: length overall 5.57 m (18 ft 6¾ in); width 1.82 m (5 ft 11½ in); height 2.25 m (7 ft 4½ in)

Powerplant: one Daimler-Benz, Büssing-NAG or Magirus water-cooled petrol engine developing between 60 and 80 bhp (45 and 60 kW)

Performance: maximum road speed 65 km/h (40 mph); maximum road range 250 km (150 miles); maximum cross-country range 200 km (125 miles); gradient 20°; fording 0.6 m (24 in)

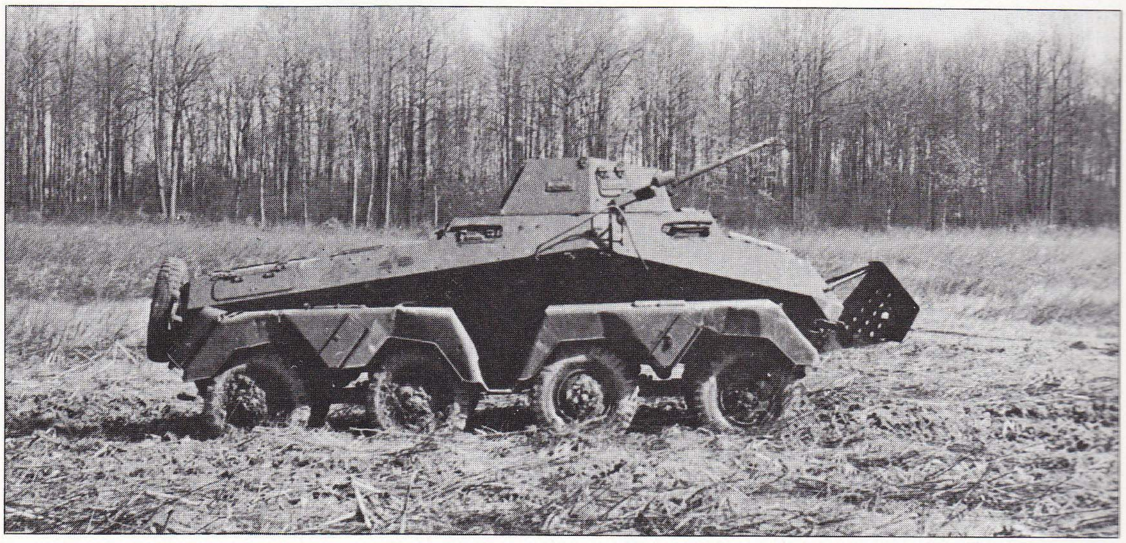
GERMANY

schwerer Panzerspähwagen SdKfz 231(8-Rad)

Almost as soon as the first six-wheeled armoured cars were issued to the expanding German army during the mid-1930s the German staff planners realized that they were not the vehicles that would be required in the long term as they were underpowered and lacked cross-country mobility. They requested an eight-wheeled armoured car with an engine to match, and decided to develop a Büssing-NAG 8×8 lorry chassis for use as an armoured car. Development began in full during 1935 and the first production examples were issued to the Army in 1937.

This 8×8 heavy armoured car was known as the **schwerer Panzerspähwagen SdKfz 231**, and to avoid confusion with the six-wheeled armoured cars with the same designation the new series was always suffixed (8-Rad), and the troops knew the type as the Achtrad. When the new eight-wheelers appeared in service they were among the most advanced cross-country vehicles yet produced, but the high road-speed and mobility had been purchased only at a high price in chassis complexity, for the layout was highly complicated, expensive and slow to produce. The chassis had all-wheel drive and steering, and fully independent suspension, and the vehicle was even able to travel across the thick mud of the Eastern Front. If the vehicle had one major fault other than its complexity it was that it was rather high and showed up prominently in combat.

The SdKfz 231 series remained in production until 1942, when it was phased out in favour of the SdKfz 234 series. By then 1,235 had been produced, and the type remained in widespread use throughout the war on all fronts. The type was particularly prominent in the North African campaigns.



The SdKfz 231(8-Rad) had a turret with a 20-mm KwK 30 or KwK 38 cannon with a co-axial 7.92-mm (0.31-in) MG 34 machine gun. The **SdKfz 232(8-Rad)** was the radio version with a prominent frame aerial, and the **SdKfz 263(8-Rad)** was a command version with a fixed superstructure in place of the rotating turret, and featuring a large frame aerial for the long-range radio equipments carried. The **SdKfz 233** had no direct six-wheeler equivalent, for it mounted a short 75-mm (2.95-in) tank gun (*Stummelkanone*) as used on early PzKpfw IV tanks. This gun was mounted in an open compartment formed by the removal of the normal turret and there was only a limited traverse for the gun. This vehicle had a crew of only three men, and was used to provide armoured reconnaissance units with improved offensive power. The first SdKfz 233 was issued during late 1942 and proved to be highly effective, but there were times when the gun's limited traverse and lack of armour-piercing performance proved to be a liability. However, when pitted against the usual run-of-the-mill reconnaissance vehicles it was likely to encounter, the SdKfz 233 was very effective and often provided covering fire for other Achtrads.

This early example of a schwerer Panzerspähwagen 231 (8-Rad) is armed with a 20-mm (0.787-in) cannon and shows the distinctive spaced armoured stowage bin mounted on the front hull. The size and bulk of this vehicle in relation to the armament carried can be seen in this view; the complexity cannot.

Specification

SdKfz 231(8-Rad)

Crew: 4

Weight: (in action) 8.3 tonnes

Dimensions: length overall 5.85 m (19 ft 2 in); width 2.20 m (7 ft 2½ in); height 2.34 m (7 ft 8 in)

Powerplant: one Büssing-NAG L8V-Gs water-cooled petrol engine developing 150 hp (112 kW)

Performance: maximum road speed 85 km/h (53 mph); maximum cross-country speed 30 km/h (19 mph); road radius of action 270 km (170 miles); cross-country radius of action 150 km (95 miles); fording 1.0 m (3 ft 3⅓ in); gradient 30°; vertical obstacle 0.5 m (1 ft 7¾ in); trench 1.25 m (4 ft 1¼ in)

German Armoured Cars in Action

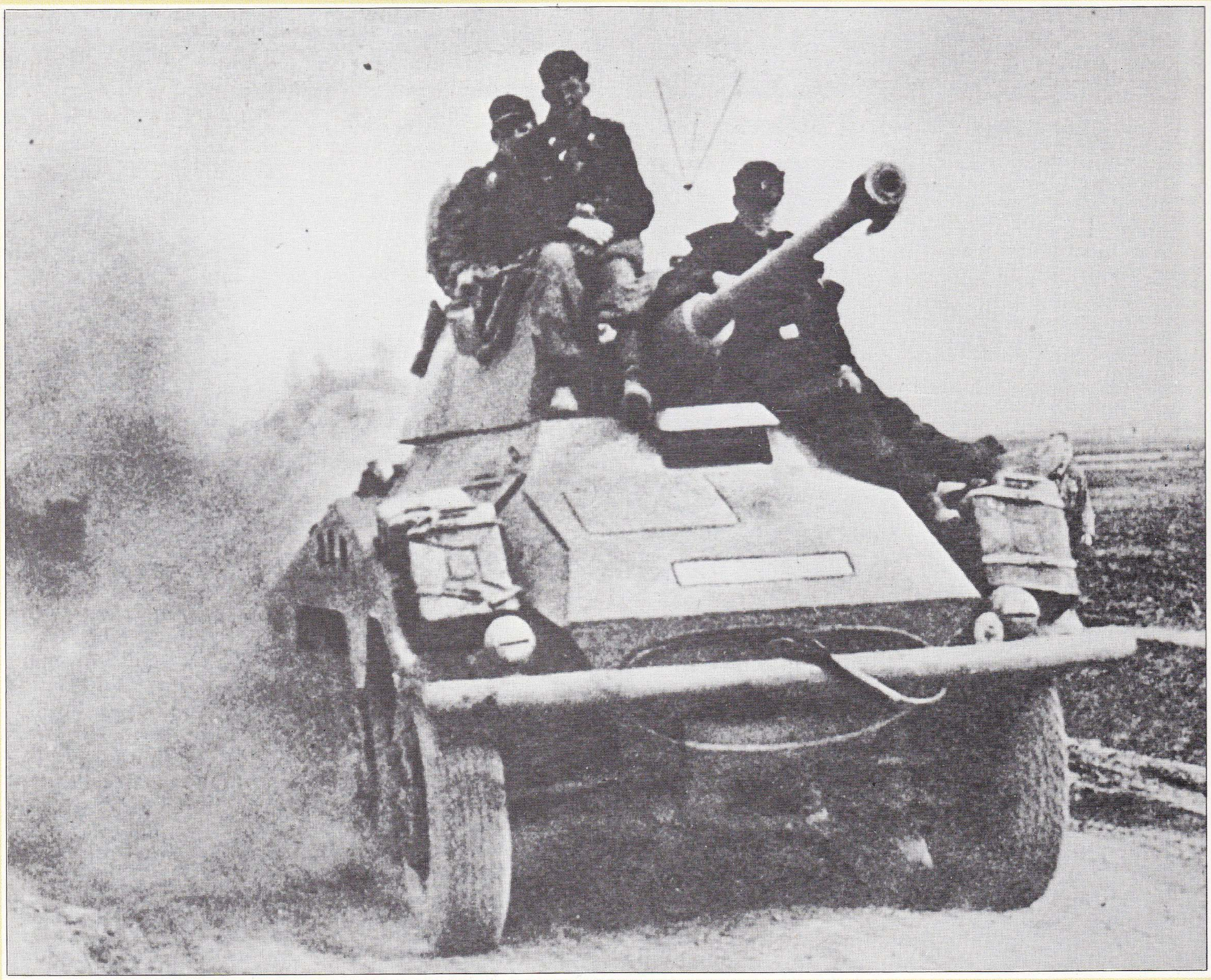
Every German Panzer division contained a dedicated reconnaissance unit. Its functions, operating ahead of the* Blitzkrieg*, dictated the form of the armoured car preferred by the Wehrmacht. German armoured cars tended to be much larger than comparable British vehicles, and usually carried a much heavier weapon than their Allied equivalents.

The Germans used the armoured car primarily for use in their reconnaissance units. There was one of these in every Panzer division, known as the Panzeraufklärungsabteilung (tank reconnaissance battalion). Although each of these reconnaissance battalions was variable in equipment levels and composition according to the local conditions and period, it always had a sizable motor cycle or *kleines Kettenrad* (halftrack motorcycle) element and a number of light vehicles. To back these light and largely unarmed vehicles there were the armoured cars, divided into light and heavy components. Again, the numbers involved varied from time to time and from theatre to theatre, but a rough guide can be drawn from the figures of 12 heavy and 42 light armoured cars, deployed in companies although they were frequently operated in troops of three vehicles. Within the Panzer divisions the truckborne infantry brigades also had their own reconnaissance units, each with four heavy and eight light armoured cars.

The Panzer divisions were not the only formations to have an armoured car allotment, for many of the infantry divisions (other than purely static garrison divisions) had a small complement of three light armoured cars to provide a measure of fire support for the largely motorcycle reconnaissance units within the infantry division. The motorized divisions had their own establishment of six heavy and 18 light armoured cars.

The reconnaissance battalion was an integral part of the Panzer division, but it must be stressed that the following figures are what might be termed textbook figures such as those used by staff planning officers; in practice, battle and other casualties often rendered such guidelines irrelevant, and once in action such figures were often well below those stated here.

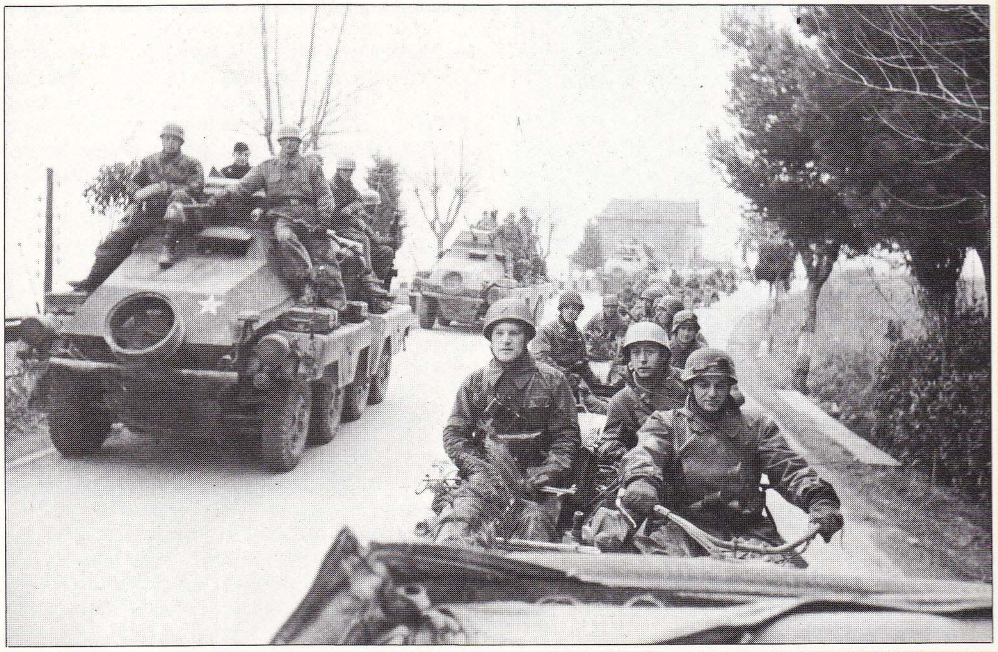
The Panzeraufklärungsabteilung had a manpower strength of 27 officers and 915 other ranks. The battalion had 199 vehicles, of which only 54 were armoured cars; there were also 22



A Puma (Panzerspähwagen SdKfz 234/2) armed with a 50-mm (1.97-in) tank gun, seen here in its element moving across the Soviet plains. Note the essential extra fuel jerry cans and the stowage of the towing cable on the front bumper.

motorcycles. The remaining vehicles included a number either carrying or towing anti-aircraft and anti-tank guns, and at least 10 vehicles were involved in the carrying of mortars. SS Panzer division reconnaissance battalions were generally similar to ordinary army Panzer equivalents (unlike some other components of the SS divisions, which were much larger). The battalion was well equipped with automatic weapons as it had a paper complement of 206 sub-machine guns, 147 light machine guns (the 7.92-mm/0.31-in MG 34 or MG 42) and four heavy machine-guns. To this automatic firepower could be added that of 35 20-mm light anti-aircraft guns (2-cm Flak 30 or 38).

The reconnaissance battalion often worked in close liaison with airborne spotter aircraft under corps or army control. These aircraft ranged far ahead of any advance or position,



A Luftwaffe field division reconnaissance unit in the Anzio/Netturno area during early 1944. The armoured cars are SdKfz 231 (8-Rad) armed with 20-mm (0.787-in) cannon, and are carrying passengers as aircraft look-outs as well as providing a lift.

GERMANY

schwerer Panzerspähwagen SdKfz 234(8-Rad)

In 1940 German army planners issued a requirement for a new 8×8 armoured car series to be based on the SdKfz 231(8-Rad) series but having a monocoque hull (i.e. one in which the basic hull structure is made up of the plates themselves rather than a framework on which are fixed the armour plates) and an engine installation more suited to operations in hot climates. The resultant vehicle was built by the parent firm Büssing-NAG with other firms under its control, and the basic hull and chassis was known as the **ARK**. It was delivered in July 1941, but the original engine installation proved troublesome and was replaced by another. A different engine installation was intended for vehicles used in North Africa, but with the end of that campaign early in 1943 the project proceeded slowly and it was not until 1944 that the first 'tropical' version was delivered.

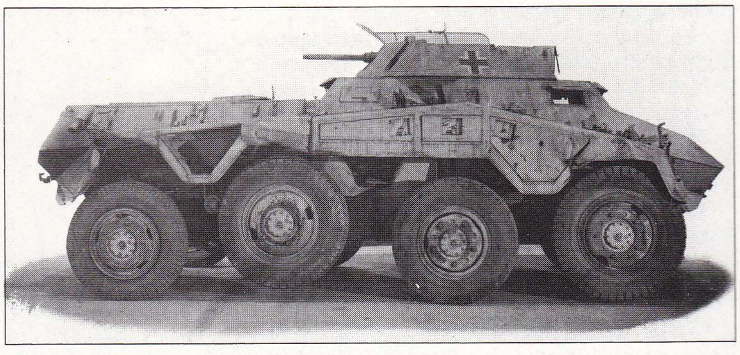
The new series of vehicles was designated **schwerer Panzerspähwagen SdKfz 234** and was much lower and more streamlined than the earlier SdKfz 231(8-Rad) series. The vehicles had thicker armour, increased internal fuel capacity and a more powerful engine bestowing a better all-round performance to the extent that it is now generally acknowledged that the variants of SdKfz 234 series were probably the best all-round vehicles in their class to be used during World War II. Most of the mechanical attributes of the SdKfz 231(8-Rad) vehicles were carried over, and there were four basic versions of the SdKfz 234. By the end of the war about 2,300 had been produced after the type had entered full production during 1943.

In designation order, the first version was the **SdKfz 234/1**, a commander's vehicle with a 20-mm KwK 30 or KwK 38 cannon in a small open-topped turret along with a co-axial 7.92-mm (0.31-in) MG 42 machine-gun. The mountings for these two weapons could be elevated to provide a degree of anti-aircraft protection, but normally the turret was covered by a wire screen to prevent the ingress of hand grenades. The most famous of the range, however, was the **SdKfz 234/2 Puma**, a superb armoured car with a turret enclosing a 50-mm (1.96-in) KwK 39/1 gun. The turret had originally been intended for the Leopard light tank, which was cancelled, and when reworked for the Puma the result was powerful enough for the vehicle to counter the increasing use of light and other tanks in Soviet army reconnaissance units. The turret had an excellent ballistic shape and also mounted a co-axial MG 42 machine-gun. So good was the vehicle that by 1945, when German industry was being drastically reorganized to maintain war production outputs, the Puma was the only reconnaissance vehicle to be kept in production (along with a Skoda light tank). But there were times when the 50-mm (1.96-in) gun of the Puma was unable to cope with enemy tanks, and the **SdKfz 234/3** was placed in production to replace the earlier SdKfz 233. It too mounted the short 75-mm (2.95-in) tank gun of the SdKfz 233, and was placed in production at the direct order of Hitler who by 1944 was concerning himself directly with such matters as fighting vehicle armament. The last variant of the SdKfz 234 series was another placed in production as the result of a direct order from Hitler. This was the **SdKfz 234/4**, which mounted a 75-mm (2.95-in) PaK 40 anti-tank gun in an open compartment in place of the turret. Only a few trial models were produced, but by the time they appeared things were becoming so desperate for the Germans that they were rushed into operational use and some were subsequently captured by the Allies.

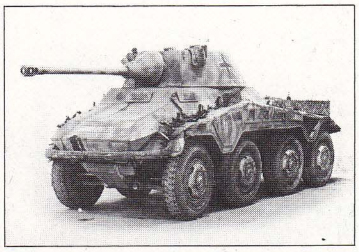
Specification

SdKfz 234/2 Puma
Crew: 4

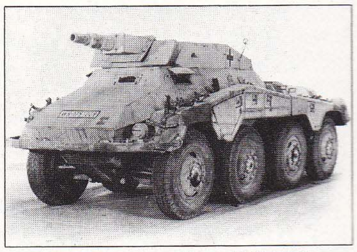
Weight: (in action) 11.74 tonnes
Dimensions: length (gun forward) 6.80 m (22 ft 3⅔ in); length (hull) 6.00 m (19 ft 8¼ in); width 2.33 m (7 ft 6½ in); height 2.38 m (7 ft 9½ in)
Powerplant: one Tatra Model 103 air-cooled diesel engine developing 210 hp (157 kW)
Performance: maximum road speed 85 km/h (53 mph); maximum cross-country speed 30 km/h (19 mph); road radius of action 1000 km (625 miles); cross-country radius of action 550 km (350 miles); fording 1.2 m (3 ft 10¾ in); gradient 30°; vertical obstacle 0.5 m (1 ft 7¾ in); trench 1.35 m (4 ft 5 in)



A captured SdKfz 234/1 has its third axle welded into place for the camera. This damaged example has the turret with its 20-mm (0.787-in) cannon traversed to the rear, and the anti-grenade mesh screen can be seen over the otherwise open turret top. Note the stowage bins, one with the cover missing.



SdKfz 234/2 Puma armed with a 50-mm (1.97-in) tank gun in a well-designed turret. This superb vehicle was later considered by many to have been one of the best armoured car designs to be produced during World War II, and it was still in production when the war ended, despite its high cost.



SdKfz 234/3 with a short (L/24) 75-mm (2.95-in) tank gun mounted on the front of an open superstructure. The vehicle was produced to provide a measure of heavy fire support for armoured car units from 1944 onwards. The gun was formerly fitted to PzKfw IV tanks, but not many were fitted to 234s.

An early example of a SdKfz 231 (8-Rad) being prepared for action. Note the arrangement of the 20-mm (0.787-in) cannon and the co-axial MG 34 machine-gun in the turret mantlet, and the large number of driver's vision slits. Note also the height of the vehicle, which was often a disadvantage in action.

and noted the approximate location and size of any enemy formations. This information was relayed by wireless back to the Panzer division headquarters, and from them to the reconnaissance battalion headquarters. The battalion headquarters rarely made a tidy allocation of resources, tending to distribute the available vehicles and manpower as and where required. This frequently meant that the armoured cars operated in troops of three vehicles or comparable small groupings. These small units tended to operate with an independence which many less well-trained forces could not contemplate, for these units operated at times as far as 100 km (60 miles) ahead of their parent divisional units. Their reconnaissance frontage was often as much as 100 km (60 miles) as well, and over such a frontage the small units were rarely in touch with one another but always in touch with their headquarters by radio. Their operational tasks were often strictly defined and were often confined to such essentials as the location and strengths of enemy armour formations, the location of major obstacles and anti-tank defences, and other major items that could impede an advance. Once the battle had been joined the reconnaissance units either withdrew to the rear, held any particular feature on a strictly temporary basis, or moved to the flanks to keep watch for potential problems there. The reconnaissance units were not expected to join in a major battle, but if they encountered more opposition than was expected they had sufficient firepower to withdraw relatively safely. They did not have sufficient firepower to undertake any major defensive tasks, but if any such occurrence did arise most armoured car patrols carried at least one artillery observation officer to call down supporting artillery support.

First use of armoured cars

By 1940 the tactical use of armoured cars units in reconnaissance was well established. The first operational experience had been gained during the upsets of the mid and late 1930s, when the new German army was frequently called upon to flex its muscles in the bloodless occupations of the Rhineland in 1936, and of the Sudetenland, Austria and the rest of Czechoslovakia in 1938 and 1939. During these operations, which were frequently mounted with half-trained or poorly-equipped units, the very sight of an armoured car unit arriving with guns at the ready in the middle of an unsuspecting town was frequently enough to persuade local officials and defence units that the full array of German military might was being brought to bear upon them, although the main German columns were often many hours' march distant. In such circumstances the large and impressive-looking six-wheeled armoured cars were frequently used to lead a small patrol into towns and cities, many photographic records of the Austrian and Czech occupation campaigns featuring at least one of these large armoured cars somewhere in the frame.

While such relatively bloodless operations did little to provide the reconnaissance units with battle experience, they did provide a great deal of logistic and mechanical experience, for in those pre-war days breakdowns were frequent and refuelling operations often went wrong. But this experience proved to have been invaluable when Germany invaded Poland in September 1939. The Panzer columns soon bit deeply into Polish territory but it was often not just the Panzer columns that created havoc in the Polish rear areas but their reconnaissance troops, operating far from their parent formations. In the open expanses of the Polish hinterland the reconnaissance units and their armoured cars could roam far and wide, and many of the tragic Polish cavalry charges that have now gone down in history were not against tanks but against armoured cars, whose machine-guns could decimate such charges as effectively as could tanks.

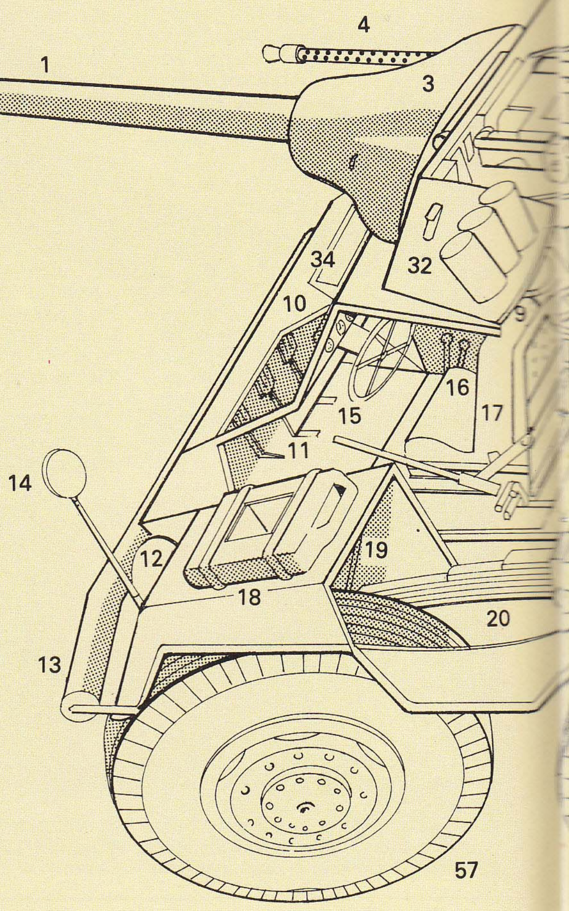
The French campaign of 1940 was not such an easy victory, but the results were militarily far more spectacular. The unexpected advance through the Ardennes region to the Meuse was spearheaded by armoured cars, the six-wheelers in particular. The Germans appear to have deliberately exploited the formidable look of these vehicles to add to their shock effect, and the appearance of one of these monsters in the middle of a demoralized French unit was frequently enough to make the French disperse or surrender without a major fight. But once the Meuse had been crossed it was the lighter SdKfz 221s that led the advance, including the rush to the Channel that split the Allied armies in two and led to the Dunkirk evacuation of the BEF. At times the reconnaissance units were operating up to 100 km (60 miles) or more ahead of the Panzer columns, using captured fuel supplies to replenish their tanks and feeding off captured enemy supplies to keep going. During at least part of this epic advance the armoured cars often had the extra support of some light motorized artillery units and a few light tanks such as the PzKpfw II, but all too often the armoured cars and their attendant motorcycles were the vanguard.

The Afrika Korps

Following the French campaign the Panzer divisions re-grouped and reorganized ready for the next campaigns. These campaigns came during 1941 with the advances into the Balkans and Greece, and culminated with the invasion of the Soviet Union. But far to the south one of the most important of all the campaigns in which the armoured cars were to participate was about to begin. This was heralded by the

Puma Armoured Car cutaway drawing key

1 50-mm KwK 39/1 gun
2 Muzzle brake
3 Mantlet (40/100-mm armour)
4 7.92-mm (0.31-in) MG 42 machine-gun
5 Gunsight
6 Guard
7 Bag for spent cartridges
8 Elevating handle
9 Control for turning turret
10 Armoured front glacis plate
11 Foot control to engage second gearbox
12 Sidelight
13 Bumper bar
14 Rear view mirror
15 Foot controls
16 Gear levers
17 Forward (first) driver's position
18 Fuel canister
19 Track rod
20 Spring
21 Ammunition box
22 Wheel arch support
23 Fuel tank
24 Door
25 Wireless aerial
26 Turret ventilator
27 Turret
28 Turntable
29 Breech of 50-mm gun
30 Hatch
31 Handle
32 Smoke canister ejectors
33 Hull frame
34 Visor
35 Second driver's position
36 Gear change
37 Handbrake
38 Main gearbox (three-speed)
39 Secondary gearbox (six-speed)
40 Final drive
41 Differential
42 Reduction box
43 Fan (two)
44 Radiator
45 Tatra 103 diesel engine
46 Engine vents
47 Radiator vents
48 Engine access hatch
49 Exhaust
50 Silencer
51 Sensors to enable drivers to judge ends of car
52 Tow bar
53 Hydraulic brake cylinder
54 Steering rod to all four wheels
55 Main frame of chassis
56 Storage bins
57 Four-wheel drive
58 Pressed steel wheels
59 Self-sealing coating to inner tubes
60 Low-pressure cord reinforced cross-country tyres
61 Mudguards

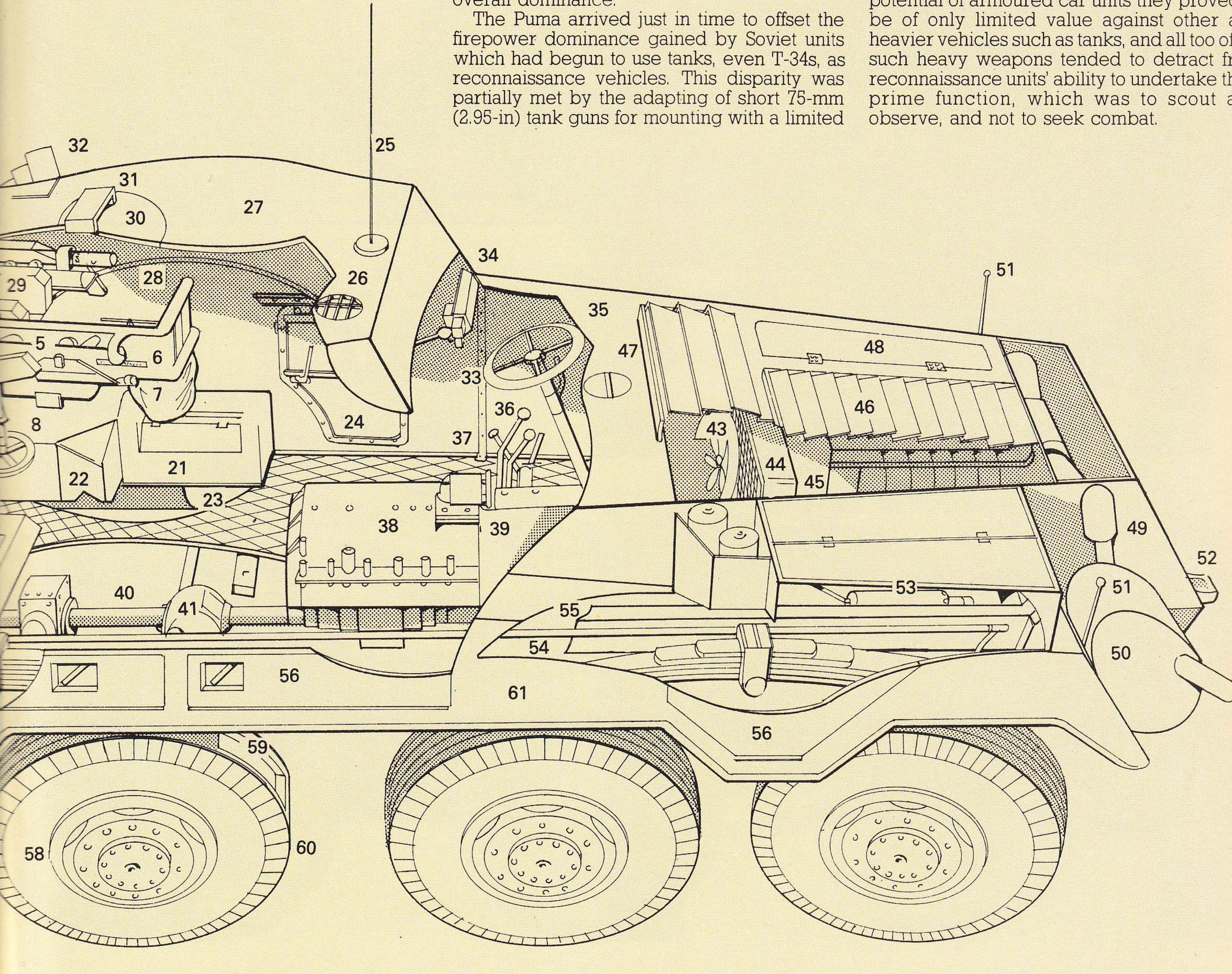


arrival of the Afrika Korps in North Africa and the start of German operations against the British and Commonwealth armies based in Egypt. The North African desert is superb armoured car terrain for much of its extent: the wide open areas of sand and rock proved to be ideal for the deployment of armoured car patrols and both sides used them on a large scale. The Germans were often restricted in their operations by a relative weakness in numbers against the numerically superior Allied equivalents, but they compensated for this by bold tactics, surprise and mobility carried to an extreme. Time and time again the German armoured car units swung far to the south into the undefended desert regions, swept round the open flank of the static British and Commonwealth lines and then turned north to raid and destroy bases in the rear, wreck supply dumps and attack air strips. Many of these raids were carried out by a few armoured cars (usually SdKfz 222s), a few trucks carrying infantry and a few light artillery pieces. It was not all a one-sided series of operations, for the Long Range Desert Group and the Special Air Service were busy returning the compliment with no lack of expertise. But the German raids were often spectacularly successful.

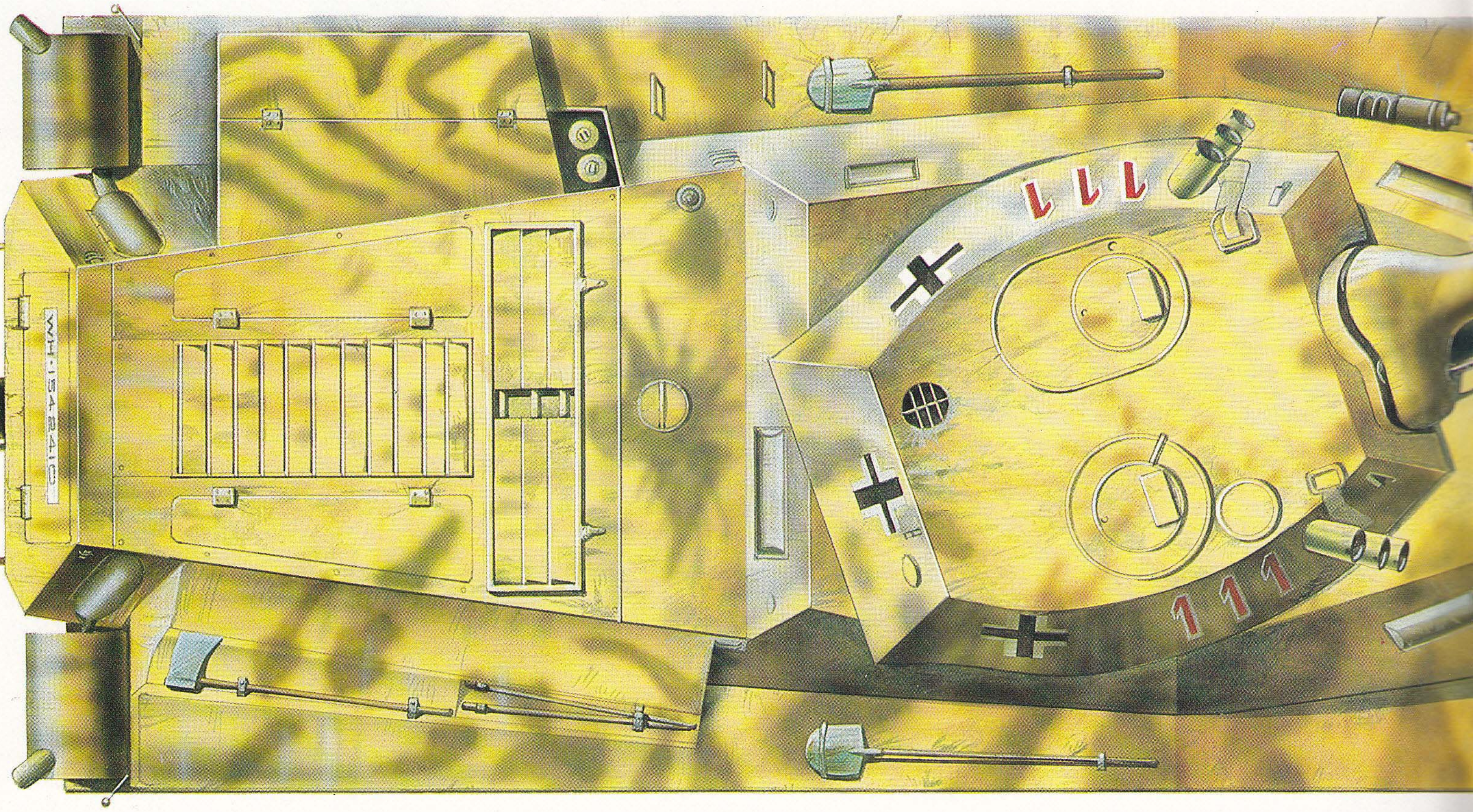
On a more formal basis the armoured car units carried out reconnaissance duties for the few Panzer formations in exactly the same manner as they had done in France. They operated well in advance of the following tanks and located and assessed likely obstacles, tried to locate anti-tank defences and generally surveyed the path of a possible advance. The main changes from France were the distances involved, but here the distances were not so great as they were far to the north east in the Soviet Union. The massive advances that followed the invasion of 1941 swallowed up whole divisions into the vast Russian plains and it was not long before the armoured car units began to suffer greatly from the distances involved and the conditions encountered. Breakdowns became more frequent as regular maintenance had to be postponed time and time again, and the supply of fuel became a major problem. The immediate problem was partially solved by the introduction of increasing numbers of the eight-wheeled armoured car designs and the phasing out of the smaller four-wheelers to patrol duties in the rear areas. More halftracks were diverted to the reconnaissance function, and it was not until the arrival of the SdKfz 234 series and especially the magnificent Puma that the reconnaissance units were once more fully able to assume their overall dominance.

The Puma arrived just in time to offset the firepower dominance gained by Soviet units which had begun to use tanks, even T-34s, as reconnaissance vehicles. This disparity was partially met by the adapting of short 75-mm (2.95-in) tank guns for mounting with a limited traverse on modified eight-wheeled armoured cars such as the SdKfz 233. Some of these had been used in small numbers in North Africa, but more were later encountered in Italy, north west Europe and the Soviet Union. While these conversions certainly added to the fighting potential of armoured car units they proved to be of only limited value against other and heavier vehicles such as tanks, and all too often such heavy weapons tended to detract from reconnaissance units' ability to undertake their prime function, which was to scout and observe, and not to seek combat.

Another example of an 'Achtrad', this time a SdKfz 232 with a large radio aerial over the turret and showing clearly the method of supporting the forward part of the aerial frame over the turret. Again, the height and bulk of the vehicle is very evident.



SdKfz 234/2 'Puma'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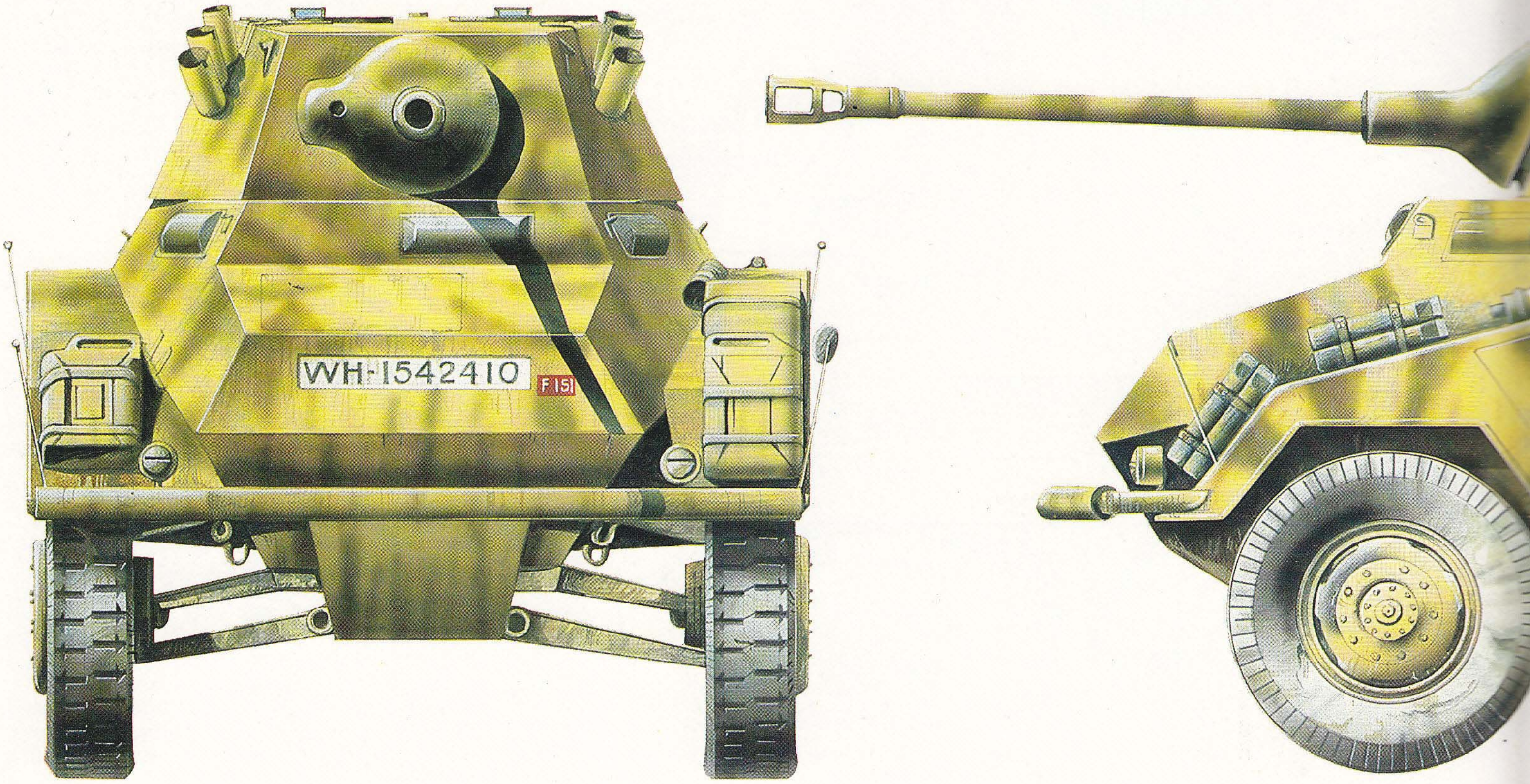
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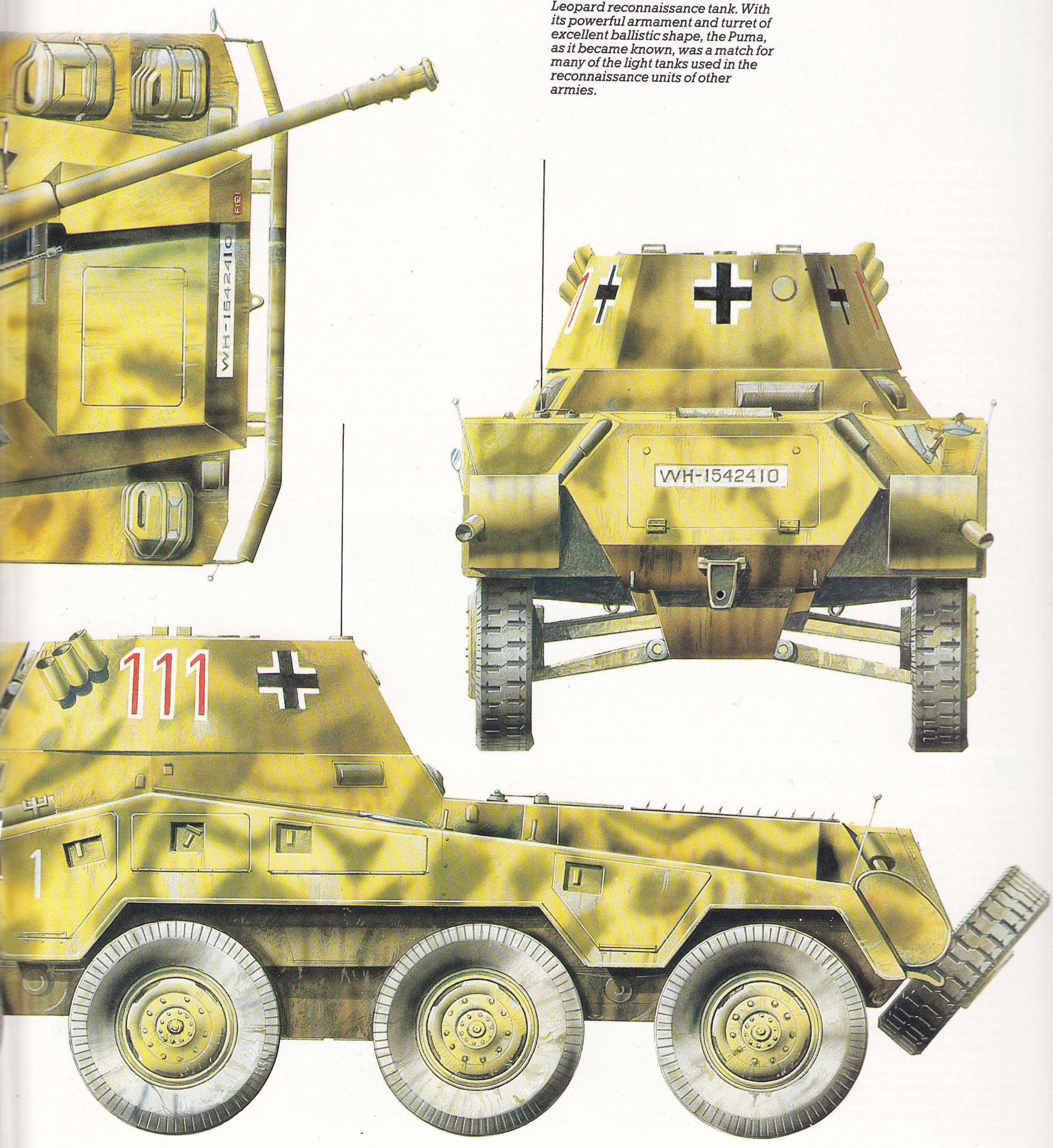
The schwerer Panzerspähwagen SdKfz 234 was one of the finest armoured cars produced in World War II. The SdKfz 234/2 had the enclosed turret and 50-mm (1.96-in) gun intended to arm the cancelled Leopard reconnaissance tank. With its powerful armament and turret of excellent ballistic shape, the Puma, as it became known, was a match for many of the light tanks used in the reconnaissance units of other armies.



GERMANY

leichter Panzerspähwagen SdKfz 222

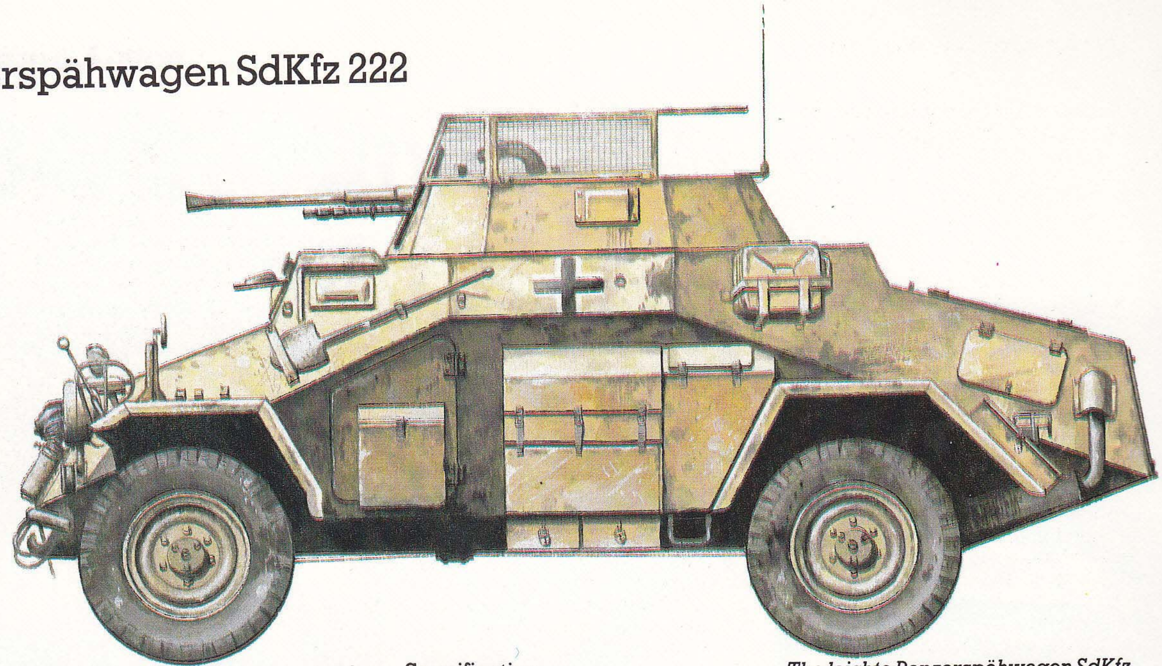
When the Nazis came to power in Germany, the army was given a virtually free hand in selecting new equipment for the expanding German armed forces, and among the equipment requested was a new series of light armoured cars to be built on a standard chassis. The requirements laid down by the army were so demanding that commercial models could not be adapted to meet them, so an entirely new design was produced and in 1935 this was used as the basis for the **leichter Panzerspähwagen SdKfz 221** 4×4, a light three-man vehicle with a small turret mounting a single 7.92-mm (0.31-in) machine-gun. From this evolved the **SdKfz 222** armoured car with a slightly larger armoured turret with an open top and the potential to mount a slightly heavier armament. The first SdKfz 222 appeared in 1938 and thereafter was adopted as the standard German army armoured car for use by the new divisional reconnaissance units.

The SdKfz 222 was initially referred to as a Waffenwagen, or weapons vehicle, as it mounted a 20-mm KwK 30 cannon, a version of the standard anti-aircraft cannon adapted for use in armoured vehicles. Later the 20-mm KwK 38 was also used. Mounted alongside this cannon was a 7.92-mm (0.31-in) MG 34 machine-gun, and this combination left little room inside the turret for the commander/gunner and the radio operator, who were further restricted in action by the use of a wire screen over the top of the open turret to prevent hand grenades from being lobbed into the vehicle. The driver was situated centrally in the front of the hull, and the superstructure was made up from well-sloped armoured plates to provide extra protection. During the war the thickness of the front hull plates was increased from 14.5 mm (0.57 in) to 30 mm (1.18 in) and the 20-mm cannon mounting was adapted to provide more elevation for use against aircraft targets.

Once in widespread service the SdKfz 222 proved to be a reliable and popular little vehicle. It served well in France during 1940, often racing far ahead of the following Panzer columns, and in North Africa the type proved itself to be a very useful reconnaissance vehicle, although somewhat restricted in its operational range by the amount of fuel that could be carried in the internal tanks. This restriction proved to be a problem during the invasion of the Soviet Union after 1941, to the extent that the SdKfz 222 was replaced by the SdKfz 250/9 halftrack mounting the same turret and used for the same role. In the west the SdKfz 222 continued in service until the end of the war, and in the Soviet Union the type was used for patrol duties in rear areas.

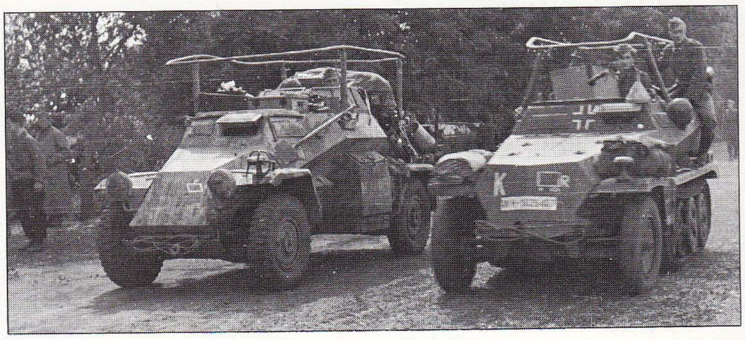
The SdKfz 221 and SdKfz 222 were not the only armoured cars of their line. There was also the **SdKfz 223**, which could be recognized by a large frame aerial over the rear of the vehicle hull as the vehicle was used as a command and communications centre and carried only a single machine-gun. The **SdKfz 260** was a long-range radio vehicle, used at higher command levels only, and the **SdKfz 261** was similar. The **SdKfz 247** was a personnel and stores carrier.

The SdKfz 222 was exported in some numbers to China before 1939, and once there was adapted to take a wide range of armament that ranged from heavy machine-guns to light anti-tank guns. Numbers of SdKfz 221s were also sent to China.



The leichte Panzerspähwagen SdKfz 222 is seen here in its usual form, armed with a 20-mm (0.787-in) cannon and MG 34 machine-gun. The wire mesh anti-grenade screen roof is in position. Note the tool and fuel-can stowage and the number of stowage boxes on the exterior, as the interior was rather cramped.

Specification
SdKfz 222
Crew: 3
Weight: (in action) 4.8 tonnes
Dimensions: length overall 4.80 m (14 ft 8½ in); width 1.95 m (6 ft 4¾ in); height 2.00 m (6 ft 6¾ in) with grenade screen
Powerplant: one Horch/Auto-Union V8-108 water-cooled petrol engine developing 81 hp (60 kW)
Performance: maximum road speed 80 km/h (50 mph); maximum cross country speed 40 km/h (25 mph); road radius of action 300 km (187 miles); cross-country radius of action 180 km (110 miles); gradient 20°; fording 0.6 m (24 in)

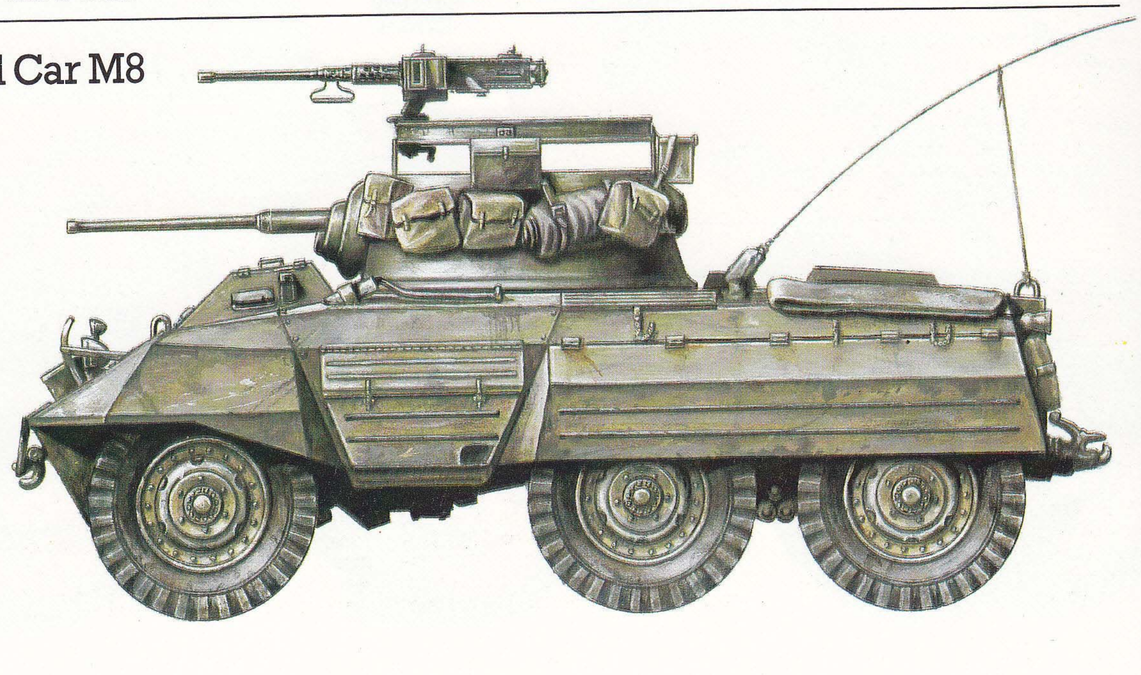


On the left is a SdKfz 223 light communications vehicle with its large and distinctive frame aerial; on the right is a SdKfz 250/3 half track, a type of vehicle that proved more suited to service in the USSR.

USA

Light Armored Car M8

Armoured cars have long been a feature of the American armoured fighting vehicle scene, and in 1940 and 1941 the US Army was able to observe operational trends in Europe and so develop a new armoured car with a good performance, a 37-mm (1.45-in) gun, 6×6 drive, a low silhouette and light weight. In typical American fashion design submissions were requested from four manufacturers. One of the manufacturers, Ford, produced a design known as the **T22**, and this was later judged to be the best of all



The American Light Armored Car M8 was considered too light in armour by the British, but was otherwise widely used. The main gun was a 37-mm (1.46-in) gun with a 7.62-mm (0.30-in) machine-gun mounted co-axially. A common addition was a 12.7-mm (0.50-in) Browning mounted on the turret.

submissions and was ordered into production as the **Light Armored Car M8.**

The M8 subsequently became the most important of all the American armoured cars and by the time production was terminated in April 1945 no fewer than 11,667 had been produced. It was a superb fighting vehicle with an excellent cross-country performance, and an indication of its sound design can be seen in the fact that many were still in use with several armies until the mid-1970s. It was a low vehicle with a full 6×6 drive configuration, with the axles arranged as one forward and two to the rear. The wheels were normally well covered by mudguards, but these were sometimes removed in action. The crew of four had ample room inside the vehicle, and the main 37-mm (1.46-in) gun was mounted in a circular open turret. A 7.62-mm (0.3-in) Browning machine-gun was mounted co-axially, and there was a pintle for a 12.7 mm (0.5-in) Browning heavy machine-gun (for anti-aircraft use) on the turret rear.

A close cousin of the M8 was the **Armored Utility Car M20**, in which the turret was removed and the fighting compartment cut away to allow the interior to be used as a personnel or supplies carrier. A machine-gun could be mounted on a ring mount over the open area. In many way the M20 became as important as the M8 for it proved to be an invaluable run-about for any number of purposes, ranging from an observation or command post to an ammunition carrier for tank units.

The US Army employed the M8 and M20 widely from the time the first production examples left the production lines in March 1943. By November of that year over 1,000 had been delivered, and during 1943 the type was issued to British and Commonwealth formations. The British knew the M8 as the **Greyhound** but it proved to be too thinly armoured to suit British thinking, the thin belly armour proving too vulnerable to anti-tank mines. Operationally this shortcoming was overcome by lining the interior floor areas with sandbags. But these drawbacks were more than overcome by the fact that the M8 was available in large numbers and that it was able to cross almost any terrain. The 37-mm (1.46-in) main gun was well able to tackle almost any enemy reconnaissance vehicle the M8 was likely to encounter, and the vehicle's crew could defend the M8 against infantry with the two machine-guns. The M8 could be kept going under all circumstanes, but its main attribute was that it nearly always seemed to be available when it was wanted.

An M8 in a typical reconnaissance situation during the Normandy fighting of 1944. The crew have stopped to observe some enemy movement or positions, and two men are observing through binoculars to obtain as comprehensive an assessment as possible.

Specification

Light Armored Car M8

Crew: 4

Weight: (in action) 7.94 tonnes

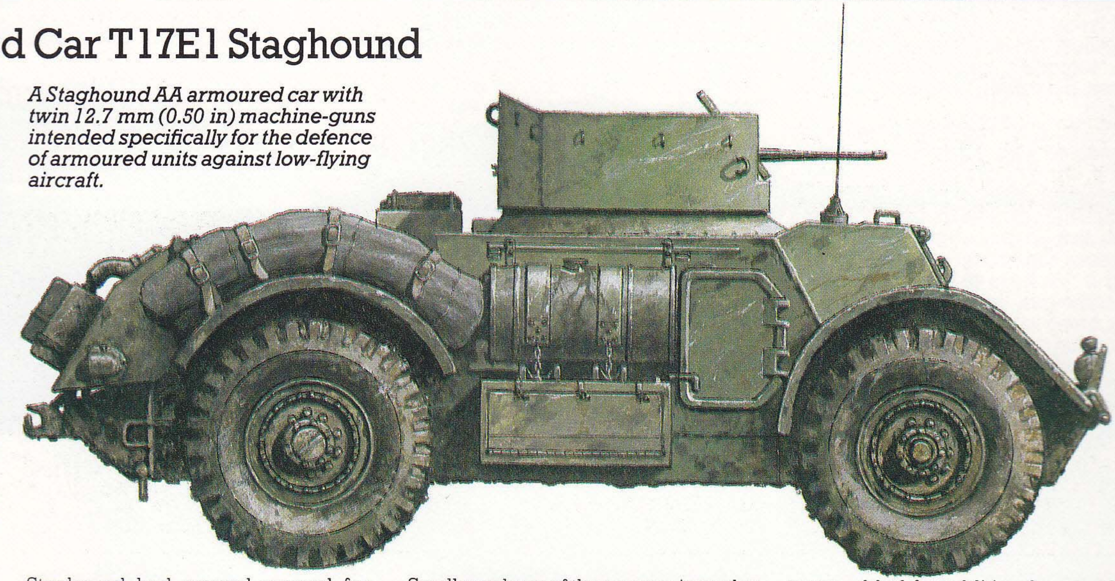
Dimensions: length 5.00 m (16 ft 5 in); width 2.54 m (8 ft 4 in); height 2.248 m (7 ft 4½ in)

Powerplant: one Hercules JXD 6-cylinder petrol engine developing 110 hp (82 kW)

Performance: maximum road speed 89 km/h (55 mph); maximum range 563 km (350 miles); fording 0.61 m (24 in); gradient 60%; vertical obstacle 0.3 m (12 in)

USA

Light Armored Car T17E1 Staghound



A Staghound AA armoured car with twin 12.7 mm (0.50 in) machine-guns intended specifically for the defence of armoured units against low-flying aircraft.

Although the **Staghound** armoured car was an American product, it was not used by the American forces, all the output going to the British army and other Allied and Commonwealth forces. The design had its origins in a US Army requirement for a heavy armoured car which was not produced despite the building of prototypes since the requirement was changed to a call for a medium armoured car. Following the drawing up of a specification, which was much influenced by input from British experience in combat, two vehicles emerged, One was the **Light Armoured Car T17**, a 6×6 vehicle by Ford, and the other the **Light Armored Car T17E1** from Chevrolet.

Only relatively few of the 6×6 T17 armoured cars were produced, as by the time the type was ready for production the requirement for a large 6×6 vehicle appeared to have passed. However, the 4×4 T17E1 went into large-scale production even though the US Army no longer had any requirement for the design. The British Tank Mission asked for an initial batch of 300, but more orders followed and by the end of 1942 the first examples were coming off the production lines. After the perilous journey across the Atlantic the T17E1s were issued to British and Commonwealth units as the **Staghound Mk I.**

The Staghound emerged as a large and well-armoured vehicle with a turret mounting a 37-mm (1.46-in) gun and a co-axial 7.62-mm (0.3-in) Browning machine-gun. The vehicle looked good and in service proved to be easy to drive and maintain, and in addition was fast and had a good operational range. The type first went into action in Italy in 1943, where it proved well able to deal with the difficult conditions that prevailed. Thereafter the Staghound was issued to Canadian, New Zealand, Indian and Belgian units. The Staghound had several unusual features for the day, not the least of which was the fully automatic hydraulic transmission. The vehicle had two engines mounted side-by-side at the rear, and the crew were well provided with periscopes. The turret was hydraulically traversed, and additional armament was provided by two more 7.62-mm (0.3-in) Browning machine-guns, one pintle-mounted for AA use and the other in the hull front.

Once the Staghound was in service several variations appeared. One was the fitting of a 76.2-mm (3-in) tank howitzer in place of the 37-mm (1.46-in) gun for use as a close-support weapon. The Americans had produced the **T17E3** version with a short 75-mm (2.95-in) howitzer in the turret, but with the introduction of the British version, known as the **Staghound Mk II**, this was not further developed. Another British innovation was the **Staghound Mk III**, a rather drastic conversion of the vehicle to accommodate a Crusader tank turret mounting a 75-mm (2.95-in) gun. Small numbers of these were issued to the heavy troops of armoured car regiments during 1944. A production variant developed in the USA was the **Staghound AA (T17E2)** which had the usual turret replaced by a new power-operated turret mounting two 12.7-mm (0.5-in) Browning machine guns for anti-aircraft use. An order for 1,000 of these was placed, but production ceased in April 1944 after 789 had been built: by then the decline of the Luftwaffe was such that there no longer seemed to be any real need for the type.

There were numerous other conversions and local variations of the Staghound, ranging from mine-clearing experimental models pushing heavy rollers to the **Staghound Command**, a version with the turret removed and increased internal stowage for radios, plus a folding canvas tilt. Local modifications such as the provision of extra external stowage boxes were common, and extras such as smoke dischargers and machine-guns were added for additional protection.

After 1945 the Staghound served on in the British army for several years, and the type was also passed to such nations as India, South Africa and Denmark (which used the Staghound Mk III for some years). The Staghound was a sturdy and well-liked armoured car that gave excellent service.

Specification

Staghound Mk I

Crew: 5

Weight: (in action) 13.92 tonnes

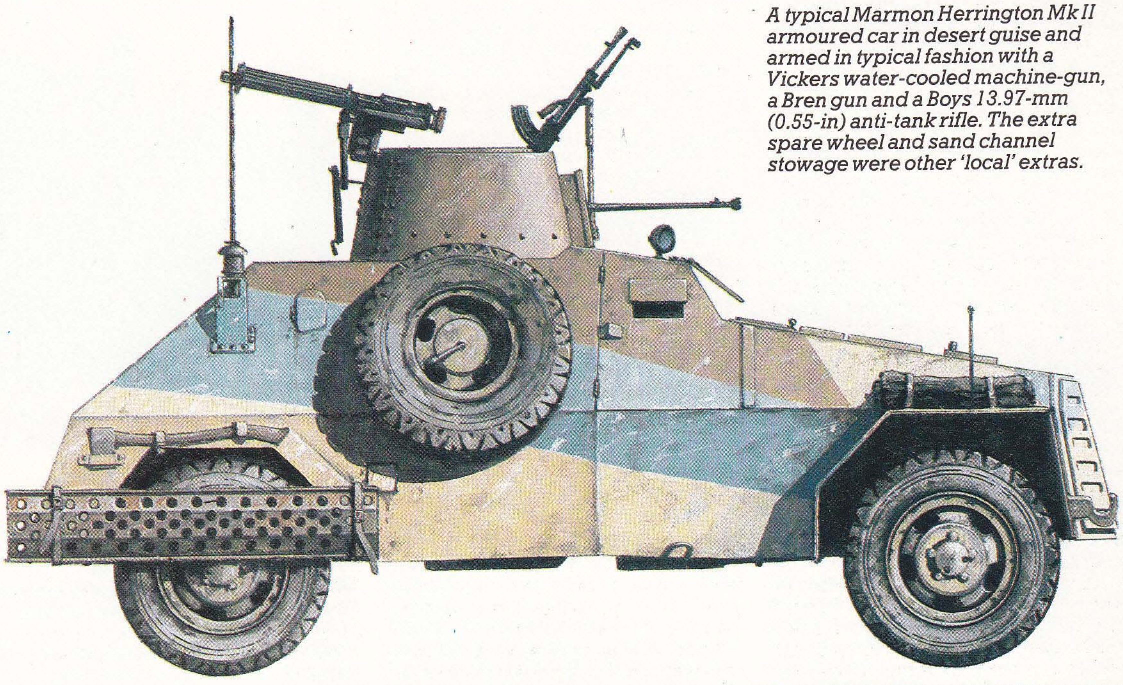
Dimensions: length 5.486 m (18 ft 0 in); width 2.69 m (8 ft 10 in); height 2.36 m (7 ft 9 in)

Powerplant: two GMC 270 6-cylinder petrol engines each developing 97 hp (72 kW)

Performance: maximum speed 89 km/h (55 mph); maximum range 724 km (450 miles); fording 0.8 m (2 ft 8 in); gradient 57%; vertical obstacle 0.533 m (1 ft 9 in)

SOUTH AFRICA

Marmon Herrington Armoured Cars



A typical Marmon Herrington Mk II armoured car in desert guise and armed in typical fashion with a Vickers water-cooled machine-gun, a Bren gun and a Boys 13.97-mm (0.55-in) anti-tank rifle. The extra spare wheel and sand channel stowage were other 'local' extras.

Despite the fact that the vehicle construction industry in South Africa had never before produced any armoured vehicles, in 1938 the government of the day ordered the development of two types of armoured car. Work on these was slow until the outbreak of war in 1939 when, after a quick survey of possible alternatives, the experimental vehicles were ordered into production. Orders soon swelled to 1,000 and, despite the fact that no facilities existed for the large-scale production of such vehicles, within only a few months the first examples were appearing.

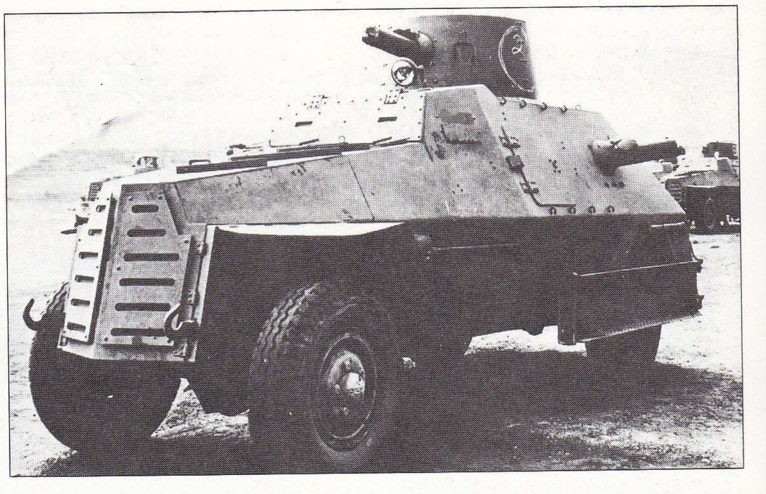
The South Africans produced their armoured cars by importing Ford truck chassis from Canada, four-wheel drive transmissions from Marmon Herrington in the USA and the armament from the United Kingdom. Local assembly and production was undertaken in local vehicle assembly plants and railway workshops, and the armour plate was produced at local steel mills. The first vehicles were known under the designation **South African Reconnaissance Vehicle Mk I**, and these had a long wheelbase and a 4×2 drive configuration. The **South African Reconnaissance Vehicle Mk II** had a shorter wheelbase and a full 4×4 drive. After early experience with the Mk Is against the Italians in East Africa, the South Africans thereafter confined the vehicles mainly to training purposes, but the Mk IIs went on to better things.

The Mk II, known to the British as the **Armoured Car, Marmon Herrington, Mk II**, was a fairly simple but effective conversion of the original truck chassis to take the new 4×4 transmission and a well-shaped armoured hull. The early versions had a turret on the roof mounting a Vickers 7.7-mm (0.303-in) machine-gun, another light machine-gun being located in the hull front, but once this combination had been tried in action it was changed to a Boys 13.97-mm (0.55-in) anti-tank rifle mounted alongside a 7.7-mm (0.303-in) machine-gun in the turret. The vehicle had a crew of four housed in the roomy hull, and the engine was a Ford V-8.

When they were first produced and issued to South African and British units in North Africa, the Marmon Herringtons were the only armoured cars available in any numbers and they formed the main equipments used by the reconnaissance units during the early Western Desert campaigns. They proved to be surprisingly effective vehicles, but their 12-mm (0.47-in) armour was often too thin to be of much use, and the armament was really too light. The troops in the field made their own changes to the armament and all manner of weapons sprouted from the turrets or from the open hulls once the turrets had been removed. One of the more common weapon fits was a captured Italian 20-mm Breda cannon, but Italian and German 37-mm (1.45-in) and 45-mm (1.77-in) tank or anti-tank guns were also used. One vehicle mounted a British 2-pdr (40-mm) tank gun, and this became the preferred armament for later marks. The **Armoured Car, Marmon Herrington Mk III** was basically similar to the Mk II though based on slightly shorter chassis, and lacked the double rear doors of the Mk II.

The Mk IIs had a hard time during the desert campaigns, but they kept going and were well-liked and sturdy vehicles. Local modifications were many and varied, and ranged from command and repair vehicles to versions with as many as four Bren guns in a turret. Gradually they were supplemented and eventually replaced by more formal armoured car designs such as the Humber. Later marks of Marmon Herrington served in other theatres, some even falling into Japanese hands in the Far East, and the number of formal versions was later extended to eight, including the Mk IV inspired by the German eight-wheeler armoured cars, but after the Mk IV most remained as prototype vehicles only. The **Armoured Car, Marmon Herrington Mk IV** was a markedly different vehicle, being a monocoque design with rear engine. Weighing 6.4 tons, the Mk IV was armed with a 2-pdr (40-mm) gun and co-axial 7.62-mm (0.3-in) Browning machine-gun. A variant was the **Mk IVF** with Canadian Ford rather than Marmon Herrington automotive components.

For a nation with limited production and development potential the Marmon Herrington armoured cars were an outstanding South African achievement.



This official photograph shows a Marmon Herrington Mk II armoured car in its original form with a Vickers 7.7-mm (0.303-in) machine-gun in the turret and another in a side-mounted mantlet. This latter weapon position was soon discarded and extra weapon positions were provided around the open turret.

Specification

Armoured Car, Marmon Herrington Mk II

Crew: 4

Weight: (in action) about 6 tonnes

Dimensions: not known

Powerplant: one Ford V-8 petrol engine

Performance: maximum speed 80.5 km/h; maximum range 322 km (200 miles)

UK

Humber Armoured Cars

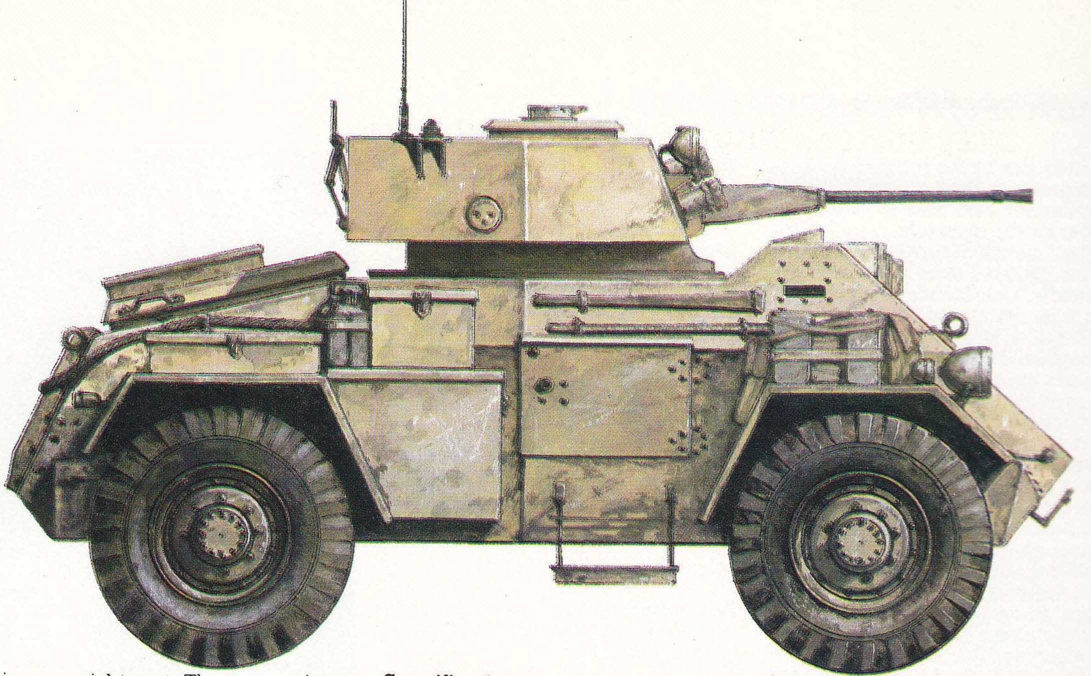
The Humber armoured cars were numerically the most important types produced in the United Kingdom, for production eventually reached a total of 5,400. The type had its origins in a pre-war Guy armoured car known as the **Tank, Light, Wheeled Mk I**, of which Guy produced 101 examples by October 1940. In that month it was realized that Guy's production facilities would be fully occupied producing light tanks, so production was switched to the Rootes Group and Karrier Motors Limited of Luton in particular. There the Guy design was rejigged for installation on a Karrier KT 4 artillery tractor chassis, Guy continuing to supply the armoured hulls and turrets. Although the new model was virtually identical to the original Guy design it was subsequently re-named the **Armoured Car, Humber Mk I.**

The Humber Mk I had a relatively short wheelbase, but it was never manoeuvrable and used a welded hull. The turret mounted two Besa machine-guns, a heavy 15-mm (0.59-in) and a lighter 7.92-mm (0.31-in) weapon. The type had a crew of three: a commander who acted as his own wireless operator, a gunner and the driver in the front hull. The first production batch ran to 500 vehicles before the **Armoured Car, Humber Mk II** introduced some improvements, mainly to the front hull which had a pronounced slope. The **Armoured Car, Humber Mk III** had a larger turret that allowed a crew of four to be carried, while the **Armoured Car, Humber Mk IV** reverted to a crew of three as the turret housed an American 37-mm (1.45-in) gun. An odd feature of this vehicle was that the driver was provided with a lever which raised a hatch covering an aperture in the rear bulkhead for use as rear vision in an emergency.

The first Humber armoured cars

were used operationally in the North African desert from late 1941 onwards, while the Humber Mk IV did not see service until the early stages of the Italian campaign, but thereafter all four marks were used wherever British and Allied troops fought in Europe. A version was produced in Canada with some changes made to suit Canadian production methods. This was known as the **Armoured Car, General Motors Mk I, Fox I**, and the main change so far as the troops in the field were concerned was that the main armament was a 12.7 mm (0.5-in) Browning heavy machine-gun plus a 7.62 mm (0.3-in) Browning medium machine-gun. There was also an extensive conversion of the Humber Mk III as a special radio carrier known as a Rear Link vehicle. This had a fixed turret with a dummy gun. Another radio-carrying version was used as a mobile artillery observation post, and numbers of Canadian Foxes were converted for this role. A later addition to many Humber armoured cars was a special anti-aircraft mounting using Vickers 'K' machine-guns that could be fired from within the turret; this mounting could also be used with Bren Guns. Smoke dischargers were another operational addition. A more extreme conversion was made with the **Armoured Car, Humber, AA, Mk I**, which had four 7.92-mm (0.31-in) Besa machine-guns in a special turret. These were introduced during 1943 at the rate of one troop of four cars for every armoured car regiment, but they were withdrawn during 1944 as there was no longer any need for them.

After 1945 many Humber armoured cars were sold or otherwise passed to other armies. Some were still giving good service to armies in the Far East as late as the early 1960s.



A Humber Armoured Car Mk II, one of the few armoured vehicles to use the 15-mm (0.59-in) Besa heavy machine-gun as its main armament. Originally known as a wheeled tank, these vehicles gave sterling service in many theatres through the war.

Specification

Armoured Car, Humber Mks I to IV

Crew: 3 (4 in Mk III)

Weight: (in action) 6.85 tonnes (Mk I) or 7.1 tonnes (Mks II to IV)

Dimensions: length 4.572 m (15 ft 0 in); width 2.184 m (7 ft 2 in); height 2.34 m (7 ft 10 in)

Powerplant: one Rootes 6-cylinder water-cooled petrol engine developing 90 bhp (67 kW)

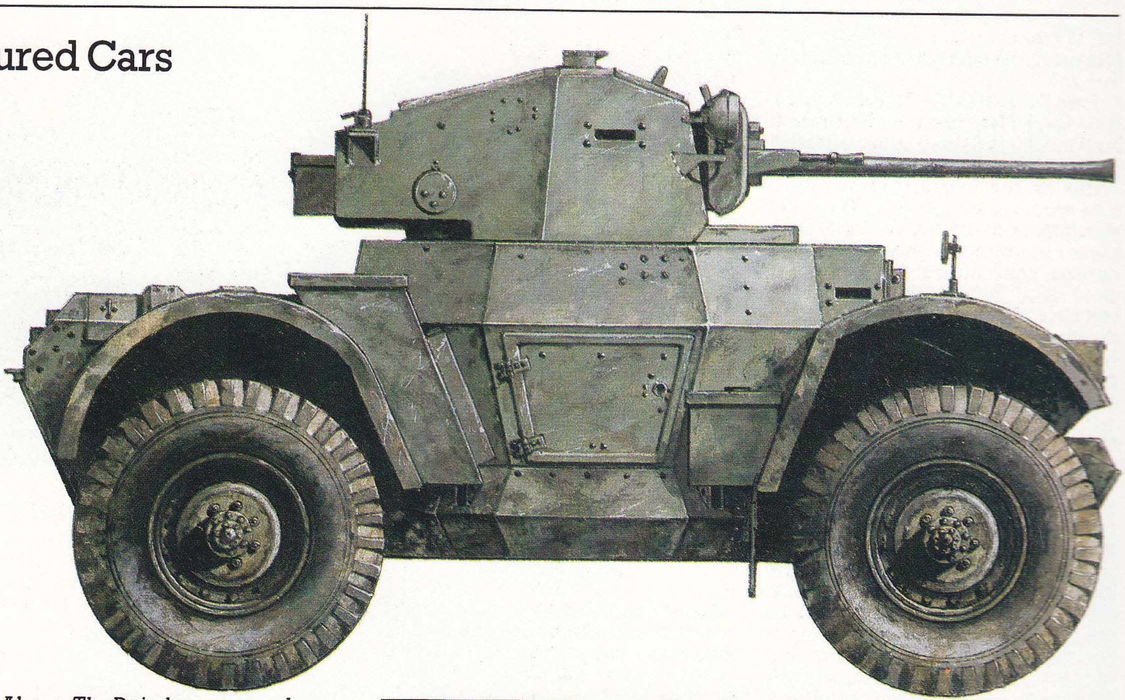
Performance: maximum speed 72 km/h (45 mph); maximum range 402 km (250 miles)

UK

Daimler Armoured Cars

When the BSA Scout Car was undergoing its initial trials, it was decided to use the basic design as the foundation for a new vehicle to be known as the **Tank, Light, Wheeled**. As with the Scout Car, Daimler took over the development of the project, and the result was a vehicle that outwardly resembled the little Scout Car but was nearly twice as heavy and had a two-man turret. Work started on the project in August 1939 and the first prototypes were running by the end of the year, although troubles soon arose as the extra weight of the turret and armour overloaded the transmission. It took some time before these problems were overcome, and it was not until April 1941 that the first production examples appeared. By then the vehicle was known as the **Armoured Car, Daimler Mk I.**

The Daimler Armoured Car was basically a Scout Car enlarged to accommodate a turret mounting a 2-pdr (40-mm) gun. The turret was the same as that designed for the Tetrarch light tank intended for use by airborne forces, but when this was placed on the Daimler it was the first such installation on a British armoured car. The turret also mounted a co-axial 7.92-mm (0.31-in) Besa machine-gun, and many vehicles also had smoke dischargers mounted on the sides of the turret. The four-wheel drive used double-coil springs on each wheel station although the early idea of using four-wheel steering was discarded as being too complex an idea without real operational benefit. One advanced feature was the use of Girling hydraulic disc brakes, well in advance of general use elsewhere. A fluid flywheel was used in place of the more usual clutch arrangement. A duplicate steering wheel and simple controls were pro-



Above: The Daimler armoured car was one of the best of all the British armoured cars, and the one that became the standard equipment for many reconnaissance regiments. Armed with a 40-mm (1.57-in) 2-pdr gun, it had limited combat capability but proved to be an excellent and reliable reconnaissance vehicle in all theatres.

Right: A Daimler armoured car in North Africa during November 1942 carries an unusual load of German prisoners-of-war. Note the North African additions of the front-mounted sand channel and the rack for extra fuel cans on the side, plus the kit stowage all over the vehicle.

vided for use by the commander in an emergency to drive to the rear. The commander also had to double as loader for the main gun.

The Daimler underwent surprisingly few changes once in service. An **Armoured Car, Daimler Mk II** version was later introduced with a new gun mounting, a slightly revised radiator arrangement and a new escape hatch through the engine compartment for the driver. There was also an experimental **Armoured Car, Daimler Mk I CS** which had a 76.2-mm (3-in) howitzer in place of the 2-pdr (40-mm) gun to provide close support fire with high explosive and smoke projectiles (the 2-pdr/40-mm gun could fire only armour-piercing projectiles), but only a few were produced. Another armament alteration was to a small number of operational Mk Is, which were fitted with the Littlejohn Adaptor, a squeeze-bore muzzle attachment that enabled the 2-pdr (40-mm) gun to fire small projectiles that could penetrate thicker armour than the normal-calibre projectile.

When the first Daimler Armoured Cars arrived in North Africa during 1941 and 1942 they were able to assume many of the operational roles of the Marmon-Herrington vehicles currently deployed in that theatre. They soon gained for themselves an enviable reputation for good all-round performance and reliability which was to remain for many years. By the end of the war not all were still in use as armoured cars, some being employed as scout or command vehicles with their turrets removed, but this was only a temporary measure and turreted vehicles served for many years after 1945. Total production was 2,694.

Specification

Armoured Car, Daimler Mk I
Crew: 3
Weight: (in action) 7.5 tonnes
Dimensions: length 3.96 m (13 ft 0 in); width 2.44 m (8 ft 0 in); height 2.235 m (7 ft 4 in)
Powerplant: one Daimler 6-cylinder petrol engine developing 95 bhp (71 kW)
Performance: maximum speed 80.5 km/h (50 mph); maximum range 330 km (205 miles)

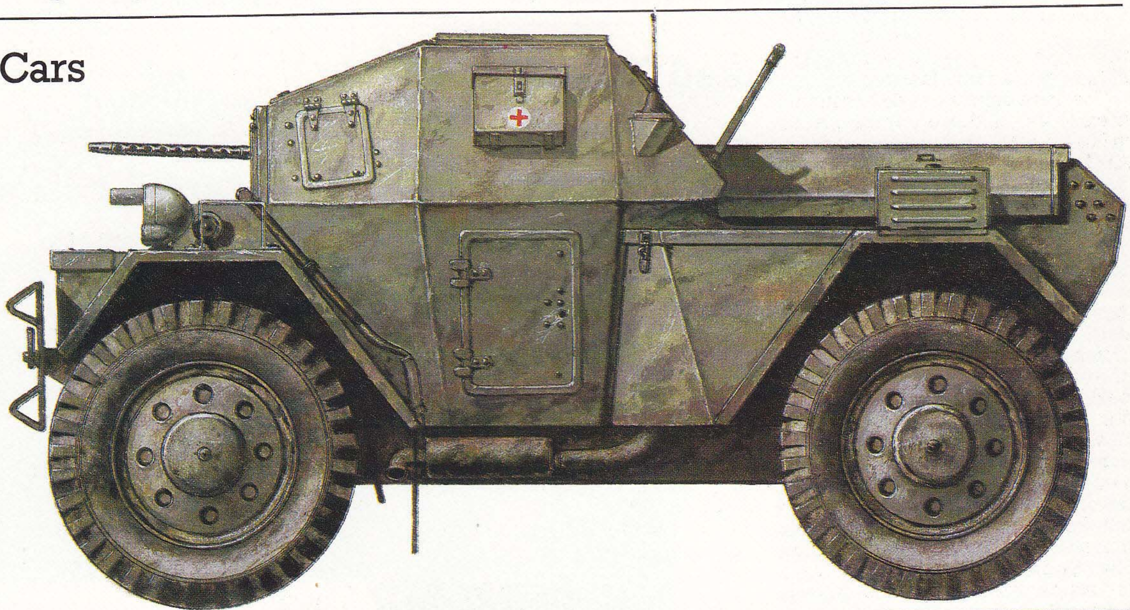
A British reconnaissance unit moves through the village of Gace in Northern France during August 1944. The turreted armoured cars are Daimlers and also visible are Daimler Scout Cars; the vehicle just visible on the left is a Humber Scout Car. The white star was the Allied recognition symbol of the period.

UK

Daimler Scout Cars

During the late 1930s the British Army was converting to mechanized traction and forming its first armoured divisions. One of the requirements to equip the new formations was a small 4×4 scout car for general liaison and reconnaissance duties, and three companies produced prototypes for comparative trials. The three companies were BSA Cycles Ltd, Morris Commercial Cars Ltd and Alvis Limited. Of the three designs entered, the BSA submission emerged as the clear winner and a production contract was placed by the War Office in May 1939. A total of 172 examples was ordered as the **Car, Scout, Mk I**, and more orders followed later.

By the time the order was placed the BSA project had been taken over by Daimler, and the designation **Car, Scout, Daimler Mk I** was applied to the vehicle. But by the time the original order was placed the War Office had called for more all-round protection for the Scout Car, as in its original form it provided the two-man crew with frontal armour only. The resultant changes needed to provide the extra armour and a folding roof over the main crew compartment added enough weight to require an improved suspension and a more powerful engine, but once these changes had been incorporated in the **Daimler Mk IA**, the Daimler Scout Car remained virtually unaltered throughout its long service life. It was a simple enough design with a full 4×4 drive configuration and front-axle steering from the **Daimler Mk II** onwards. The engine was at the rear and the crew was seated side-by-side in an open compartment with only the folding roof for overhead cover. This roof was removed on the **Daimler Mk III** as experience showed that it was rarely used operationally. The only armament carried was a single 7.7-mm



Above: The little Daimler Scout Car was in production as World War II began and was still in production when it ended. Although only lightly armed it was quiet and nippy, and proved to be one of the best of all reconnaissance vehicles in use by any side throughout the war.

Right: These Daimler Scout cars are ready for the Tunis Victory Parade of May 1943. Behind them is a Daimler armoured car and a Humber Mk II; the aircraft is a French Caudron Goeland captured from the Luftwaffe. These vehicles were used on the occasion as escorts for some of the VIPs arriving for the parade.

(0.303-in) Bren Gun firing through a hatch in the front superstructure, although other arrangements such as anti-aircraft mountings were sometimes provided.

The Daimler Scout Car proved itself to be a very tough and reliable little vehicle. It had the unusual distinction of being one of the few World War II vehicles in service when the war started and still remaining in production as the war ended. It was used by all manner of units other than the reconnaissance units for which it was originally intended, for it was also used by artillery units as a mobile observation post and by Royal Engineer units for locating mine fields and bridging positions. Many staff officers used them as run-arounds and liaison vehicles, and they were often added to motorized infantry units for reconnaissance and liaison purposes. In all these roles the Daimlers ran for enormous distances without benefit of maintenance or care and still kept going when needed. They were used by many Commonwealth armies other than the British army, and many served on with several armed forces for many years after the war. Most of them left British army service in the mid-1950s, but a few served on for years afterwards. Many are now prized collector's pieces and it would not be surprising if a few were still kept operational by some of the smaller armies around the world.

Specification
Car, Scout, Daimler Mk I
Crew: 2
Weight: (in action) 3 tonnes
Dimensions: length 3.226 m (10 ft 5 in); width 1.715 m (5 ft 7½ in); height 1.50 m (4 ft 11 in)
Powerplant: one Daimler 6-cylinder petrol engine developing 55 bhp (41 kW)
Performance: maximum speed 88.5 km/h (55 mph); maximum range 322 km (200 miles)

UK

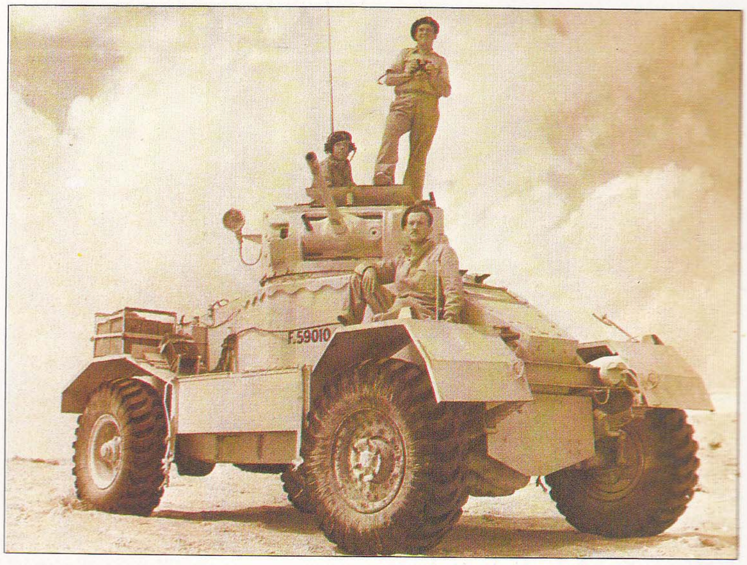
AEC Armoured Cars

The first AEC (Associated Engineering Company Ltd of Southall, London, a company that normally made London buses) armoured car was produced as a private venture based on information filtering back from the North African battlefields. What AEC had produced was virtually a wheeled tank, for the resultant vehicle was fairly large by contemporary standards and was equipped with armour nearly as thick as that used on the current 'cruiser' tanks. The basic chassis used for the AEC armoured cars was based on that used for the Matador artillery tractor, but by the time this had been revised for the armoured car role many changes had been introduced, including an engine set at a slight front-to-rear angle to enable the overall height of the vehicle to be lowered.

The first example was demonstrated in early 1941, and an order was placed in June of that year. The **Armoured Car, AEC Mk I** mounted a 2-pdr (40-mm) gun and co-axial 7.92-mm (0.31-in) Besa machine-gun in the same turret as that used on the Valentine infantry tank, but only 120 vehicles had been produced before calls came for something more powerful for use in North Africa. The result was a revision that introduced a new three-man turret mounting a 6-pdr gun with a calibre of 57 mm (2.244 in), but even this was not powerful enough for the troops in the field and the **Armoured Car, AEC Mk II** was replaced in production by the **Armoured Car, AEC MK III** with the same turret mounting the British-developed version of the American M3 75-mm (2.95-in) tank gun. This made the AEC Mk III a very powerful armoured car, and it was used as a fire-support vehicle for armoured car regiments until the end of the war, mainly in Italy.

The AEC vehicles had a conventional layout with the engine at the rear. Although the vehicle had a full 4×4 drive configuration, it was possible to alter this to a 4×2 form with the drive and steering on the front wheels, though this configuration was used only for road travel. The degree of protection for the crew was taken to the point where the driver had no direct vision devices when closed down; he had to rely on periscopes alone. With the hatch open the driver's seat could be raised to allow him to raise his head out of the hatch. The vehicle had a rather slab-sided appearance, largely as a result of the provision of large lockers between the front and rear mudguards, and on the Mk II revisions had to be made to the bluff front hull shape to improve obstacle crossing and to improve armour protection. The heavy turret of the Mks II and III was provided with electric power for traversing.

One of the first AEC armoured cars to arrive in North Africa, this Mk I is recognizable by the ex-Valentine infantry tank turret and the 2-pdr gun. The bulk and height of these vehicles can be easily seen, but the vehicle appears to have few of the many extras which were fitted in the field to combat examples.



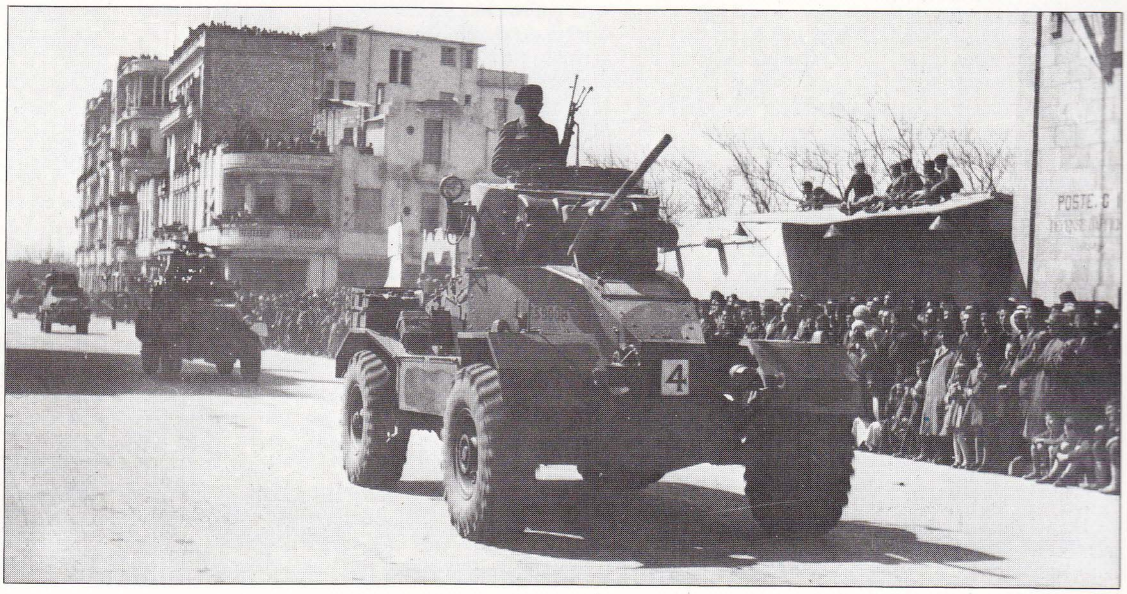
Production of all the AEC armoured car marks ceased after 629 had been produced. The vehicles were used in North Africa and Tunisia and thereafter in Italy. Some Mk IIIs were used in north west Europe until the end of the war, most of them in the heavy troops of armoured car regiments. A few were used for odd experiments such as pushing mine-clearing rollers, and at least one example was fitted with a special anti-aircraft turret mounting two 20-mm cannon.

In 1944 a batch of AEC armoured cars was sent into Yugoslavia for use by the partisans, but the activities of these vehicles have still to be fully uncovered. After 1945 numbers were issued to the newly re-formed Belgian reconnaissance regiments, and these vehicles served until at least 1950.

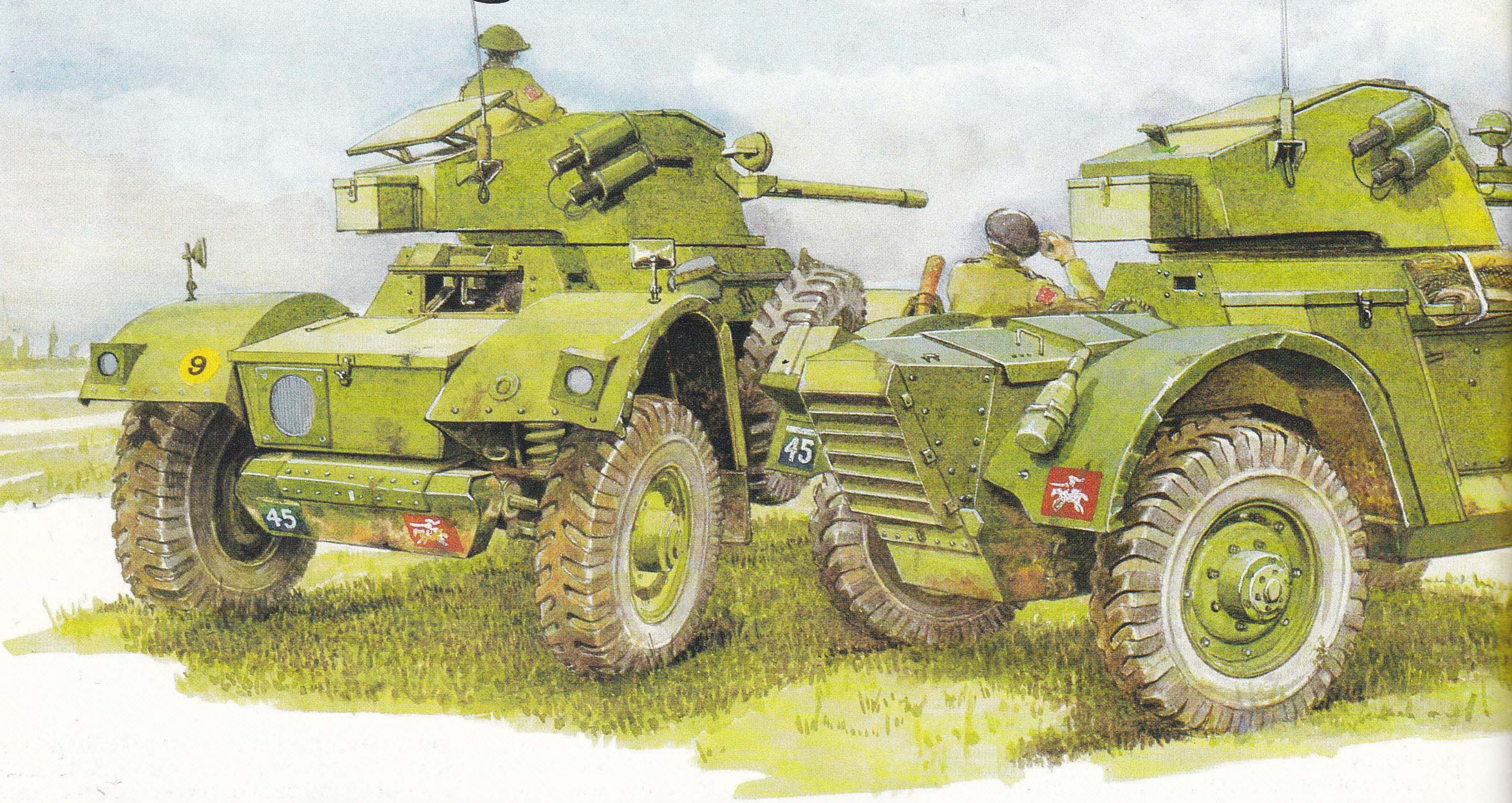
Specification
Armoured Car, AEC Mk I
Crew: 3
Weight: (in action) 11 tonnes
Dimensions: length overall 5.18 m (17 ft 0 in); width 2.70 m (8 ft 10½ in); height 2.55 m (8 ft 4½ in)
Powerplant: one AEC 6-cylinder diesel engine developing 105 bhp (78 kW)
Performance: maximum speed 58 km/h (36 mph); maximum range 402 km (250 miles)

Specification
Armoured Car, AEC Mk II and Mk III
Crew: 4
Weight: (in action) 12.7 tonnes
Dimensions: length overall (Mk II) 5.182 m (17 ft 10 in) or (Mk III) 5.613 m (18 ft 5 in); width 2.70 m (8 ft 10½ in); height 2.69 m (8 ft 10 in)
Powerplant: one AEC 6-cylinder diesel engine developing 155 bhp (116 kW)
Performance: maximum speed 66 km/h (41 mph); maximum range 402 km (250 miles)

An AEC Mk I armoured car proceeding through Aleppo, Syria during April 1943. This vehicle has an anti-aircraft Bren gun mounting on the turret and the driver's hatch is fully open. Behind are Marmon Herrington armoured cars, which were by then being phased out of service.



Allied Reconnaissance Units from D-Day to Berlin



In 1940 the Wehrmacht had been the masters of the battlefield, and by 1944 the lesson in mobile warfare had been taken to heart by the Allies. From their beachhead in Normandy, the Allies swept through northern France in a massive drive to the Rhine and the heart of German industrial power in the Ruhr; in the forefront of the drive were the Allied reconnaissance units, playing their parts in the campaign to end the war in Europe.

By June 1944 the organization of British armoured car regiments had settled down to a form involving a regimental headquarters and four 'Sabre' fighting squadrons. The equipment of these units varied somewhat from time to time and between regiments, but the basic personnel strength was about 650 men. The regimental headquarters had 12 or 13 Daimler or Humber scout cars, a Daimler armoured car, three Staghounds, four Humber AA armoured cars (later withdrawn) and some form of armoured command vehicle. The four Sabre squadrons each had its own squadron headquarters with one Daimler scout car and a Daimler armoured car, and three Staghounds. There were five reconnaissance troops within the squadron, each with two Daimler scout cars and two Daimler armoured cars. Within each squadron was a support troop with a single Daimler scout car and three White scout cars used as armoured personnel carriers. To back up these units was a single support section with two 75-mm (2.95-in) self-propelled guns. These could be guns mounted on half-tracks or AEC Mk 3 armoured cars with the gun mounted in a large turret.

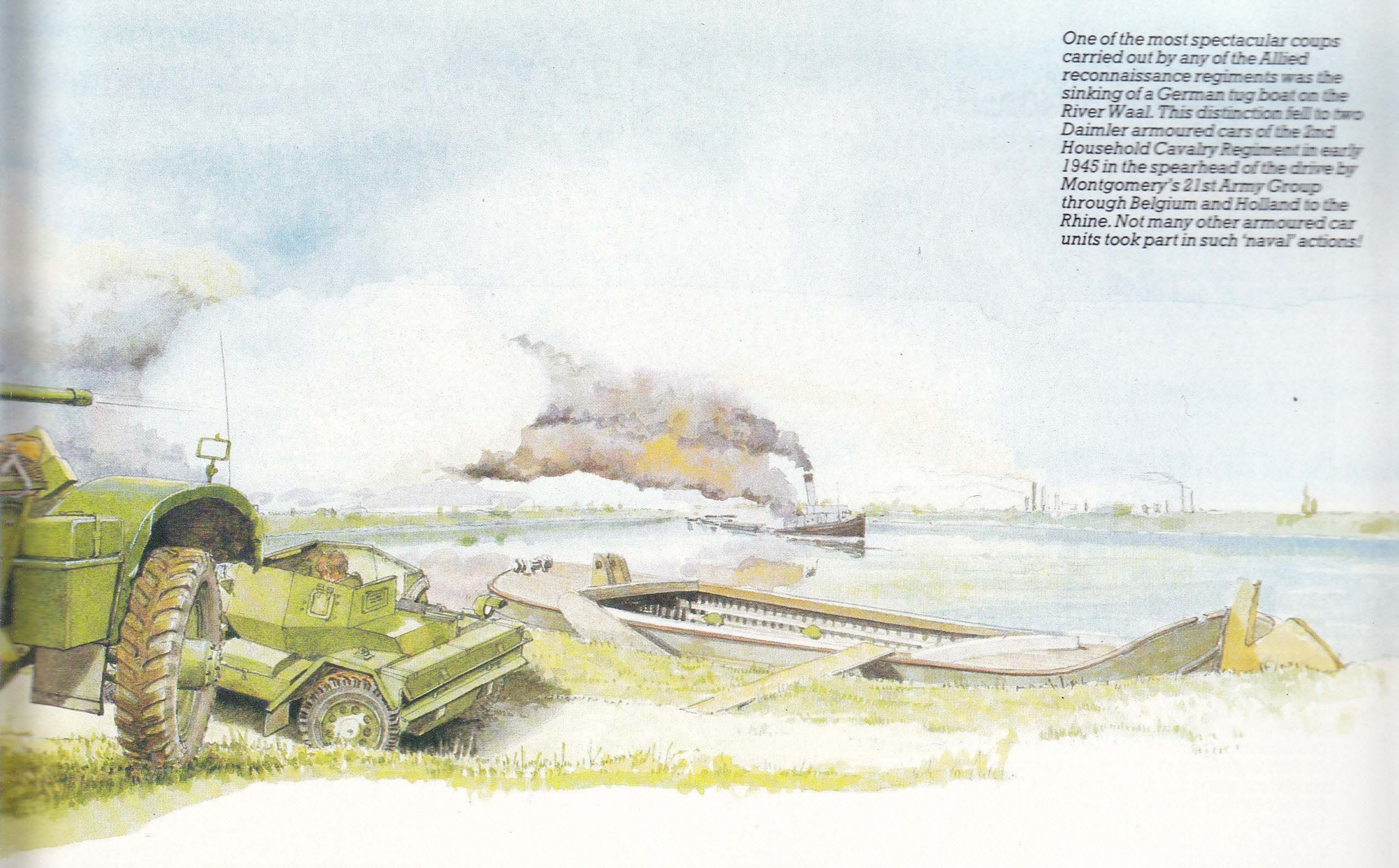
Losses in Normandy

After the D-Day landings, the Daimler scout car and the Daimler armoured car were the preferred equipments for the reconnaissance role, despite the general opinion that the Daimler armoured car was somewhat underpowered. For the scouting role the little scout cars were the preferred vehicles as they were easy to conceal, relatively quiet in use, and nippy and handy enough to move out of trouble when it was met. But in the early days of the Normandy campaigns the terrain was too enclosed and well defended for scout cars to operate unhindered, and the German defensive tactics ensured a steady rate of attrition among the reconnaissance troops; one regiment, for example, lost 25 scout cars during the first month of the Normandy fighting. During the desperate slogging matches that marked the approaches to Caen the reconnaissance regiments could contribute little other than local battlefield reconnaissance, but once Caen was taken and the British and Commonwealth divisions moved forward the reconnaissance regiments once more came into their own.

The late summer of 1944 was marked by a series of rapid advances through the remains of the German armed forces in France. Throughout this time the armoured cars and scout cars ranged far and wide seeking out and passing back information, warning of defended positions and localities and generally attempting to move forward to maintain the vital momentum. As in Normandy, much of the information was gained from the stealthy use of scout cars, to the extent that numbers of Daimler armoured cars had their turrets removed to reduce their height. These were known to the troops as SODs (Sawn Off Daimlers) and the loss of their 2-pdr (40-mm) guns was seen as no great problem as by 1944 the weapon was of very limited value, even with the addition of the Littlejohn adaptor to improve armour-piercing performance. If the scout cars did come up against opposition, the Daimler armoured cars with guns still mounted were called up to try to outflank and possibly to destroy the opposition so that the momentum of the advance could be maintained. If this were not possible the support section (or troop) could be called upon to add the weight of its 75-mm (2.95-in) guns. If enemy armour was encountered the scout and armoured cars had no option but to report the fact and then do their best to get out of the way.

As the reconnaissance regiments moved north east out of France they entered the cluttered road network of Belgium, and were able to make good progress towards Brussels. The entry of the first armoured cars into Brussels was an occasion that none there would ever forget. On 3 September 1944 units of the Household Cavalry were the first to reach the capital and were greeted to a riotous welcome by cheering crowds. This created a state of euphoria that was soon dispelled by the failure of Operation 'Market Garden', when the same units that had entered Brussels could not reach the bridge at Arnhem. The advance towards the airborne units holding the Arnhem bridge had to cross flat open country, where the only method of advance was along straight roads on which single German defensive positions were able to inflict delay after delay.

The armoured car units were unable to take much part in the battles to free the port of Antwerp, and by the end of 1944 the



One of the most spectacular coups carried out by any of the Allied reconnaissance regiments was the sinking of a German tug boat on the River Waal. This distinction fell to two Daimler armoured cars of the 2nd Household Cavalry Regiment in early 1945 in the spearhead of the drive by Montgomery's 21st Army Group through Belgium and Holland to the Rhine. Not many other armoured car units took part in such 'naval' actions!

approaches to the Rhine and Saar rivers were marked by a series of set-piece battles. The Ardennes offensive mounted by the Germans was too far south to affect the British forces directly, but early in 1945 the Rhineland battles took place mainly in heavily wooded country where the limited reconnaissance the scout cars were able to collect was of great value. By March 1944 the Allies were on the Rhine, and after the Rhine crossings the armoured cars once more spread their way across the north German plains towards the Baltic. In early April it was a reconnaissance unit that had the dubious distinction of being the first to enter the horrific concentration camp at Belsen. By this time German resistance had crumbled, and by late April the British and Commonwealth forces were approaching the Elbe. By early May armoured reconnaissance units had sighted the Baltic and on 2 May British and Soviet reconnaissance units met each other at Wismar.

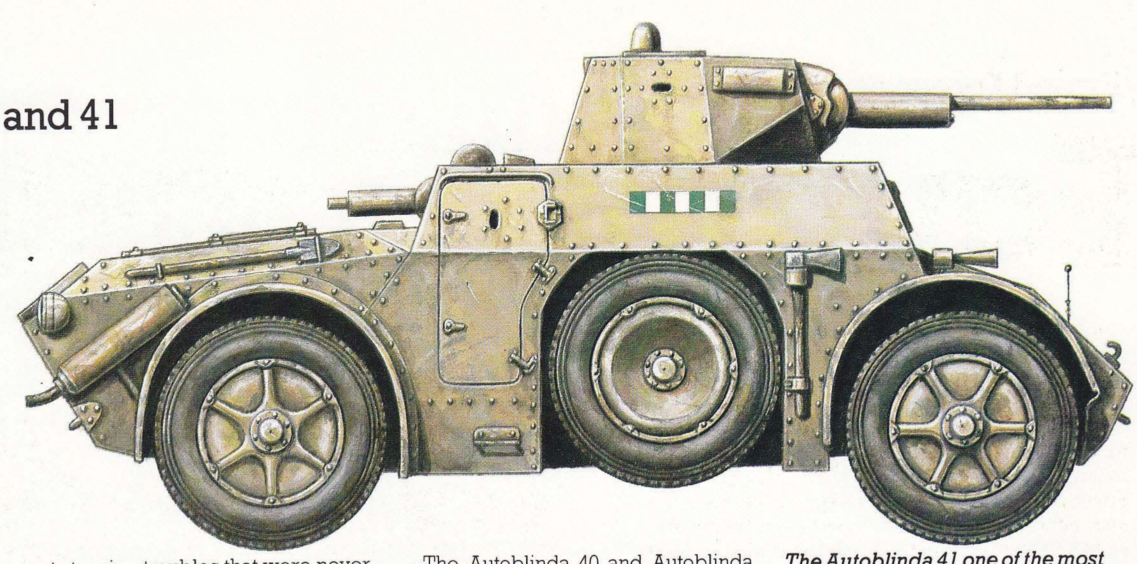
It was all over soon after. The German surrender was signed at Lüneberg Heath and the reconnaissance regiments never did reach Berlin while the conflict was in progress. That distinction had to be delayed for a while until the Allies could sort out their zones of occupation, but when the British army did arrive to take over its sector of Berlin (which it still occupies), in the vanguard were the armoured and scout cars that had done so much to clear the path of the Allied forces.

Above: Prime Minister Winston Churchill used a Humber Mk II armoured car as a mobile grandstand to observe the Rhine Crossings of 25 March 1945. By 1945 this Humber must have been relegated to second-line duties, but it did have the additional armament of twin Vickers K machine-guns for anti-aircraft defence. Note also the smoke dischargers.

Right: An American Light Armoured Car M8 on the road to Geilenkirchen during November 1944. On the side of the road is a knocked-out StuG 111 assault gun, but the M8 was unlikely to have had any part in its demise as the 37-mm (1.45-in) turret gun of the M8 was too light to tackle such opponents.

ITALY

Autoblinda 40 and 41



The Autoblinda 41, one of the most numerous of the Italian armoured cars, is shown armed with a turret-mounted 20-mm cannon and a machine-gun at the hull rear.

The **Autoblinda 40** and **Autoblinda 41** armoured cars had their origins in a requirement for a high-performance car for use by the Italian colonial police in the new Italian colonies in Africa. The Italian cavalry branch had a requirement for a new armoured car at about the same time, so the two projects were merged to produce a new vehicle design that appeared in 1939. This new design had the engine at the rear and a turret (mounting a machine-gun) towards the front. There was another machine-gun in the hull rear and the vehicle could be driven from either the normal front position or another position in the hull rear. From this design evolved the Autoblinda 40, of which production began by the middle of 1940.

When the original production order was placed it was specified that a small number of Autoblinda 40s would be produced with a 20-mm cannon in place of the two 8-mm (0.315-in) turret machine-guns. This was achieved by using the turret of the L 6/40 light tank in place of the original turret, and with the appearance of this version known as the Autoblinda 41, it was realized that this vehicle/weapon combination was far more effective than the machine-gun version, and thereafter production centred on the Autoblinda 41. Relatively few Autoblinda 40s were produced, and many of these were later converted to the Autoblinda 41 configuration.

For its time the Autoblinda 41 was an advanced design and possessed good performance marred only by recurrent steering troubles that were never entirely eliminated. The main armament was a converted 20-mm Breda modello 35 anti-aircraft cannon, and this weapon was mounted co-axially with an 8-mm (0.315-in) Breda modello 38 air-cooled machine-gun specially designed for use in armoured vehicles. Another of these machine-guns was mounted at the hull rear. One vehicle in four had provision for an anti-aircraft machine-gun mounting on top of the turret. Special sand or normal road tyres could be fitted, and there was a kit available to convert the vehicle for use on railway tracks. This kit included railway wheels and extra lighting and signalling devices, along with a searchlight to be mounted on the turret. Autoblinda 41s fitted with these kits were used extensively for anti-partisan patrols in the Balkans.

The Autoblinda 40 and Autoblinda 41 were extensively used by Italian reconnaissance units in the Western Desert and Tunisia. At the end of September 1942 there were 298 Autoblinda 41s in use, and more were employed by the colonial police. Some development work was carried out on the basic design, which later led to the mounting of a 47-mm (1.85-in) gun in the turret (**AB 43**), while an open-hulled variant had a German 50-mm (1.97-in) tank gun but neither of these vehicles was placed in production. There was also an open-hulled variant that was produced in small numbers as a command vehicle or mobile observation post for artillery units.

Specification

Autoblinda 41

Crew: 4

Weight: (in action) 7.5 tonnes

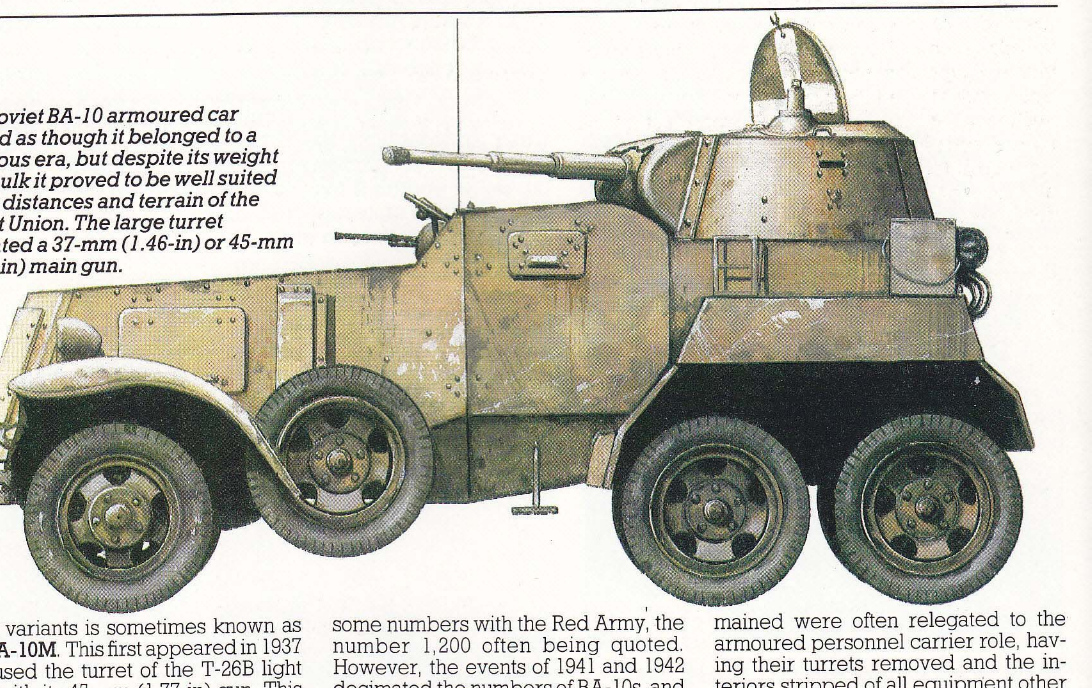
Dimensions: length overall 5.20 m (17 ft 1½ in); width 1.92 m (6 ft 4¼ in); height 2.48 m (7 ft 11½ in)

Performance: one SAP Abm 1 6-cylinder water-cooled inline petrol engine developing 80 bhp (60 kW)

Performance: maximum road speed 78 km/h (49 mph); maximum cross-country speed 38 km/h (24 mph); maximum road range 400 km (248 miles); fording 0.7 m (28 in); gradient 40%; vertical obstacle 0.3 m (12 in)

USSR

BA-10



The Soviet BA-10 armoured car looked as though it belonged to a previous era, but despite its weight and bulk it proved to be well suited to the distances and terrain of the Soviet Union. The large turret mounted a 37-mm (1.46-in) or 45-mm (1.77-in) main gun.

The first **BA-10** six-wheeled armoured car appeared in 1932. It was produced at the Gorki automobile plant, and was the logical outcome of a series of six-wheeled armoured cars that could be traced back to World War I, even though the configuration had been in abeyance for some years. The BA-10 was built on the chassis of the GAZ-AAA six-wheeled commercial truck, though the suspension was modified to assume the loads involved and some reinforcements were made to the chassis members. The layout of the BA-10 was orthodox, with the engine under an armoured cover at the front and the turret mounted at the rear over the twin rear axles. There were several variations in the armament carried, but the main armament was either a 37-mm (1.46-in) tank gun or a 12.7-mm (0.5-in) DShK heavy machine-gun. Later versions used a 45-mm (1.77-in) main gun.

Like other Soviet armoured fighting vehicles the BA-10 was a functional and hefty item of equipment. It had several typically Soviet design subfeatures such as the ability to wear tracks or chains on the rear axles to assist traction in mud and snow, and the spare wheels were located so that they could turn when obstacles under the chassis were encountered, and thus take some of the load. There was a crew of four, one of whom attended to the 7.62-mm (0.3-in) machine-gun fitted into a mounting on the front supertructure to the right of the driver.

Later versions of the BA-10 are sometime known as the **BA-32**, and to confuse matters further one of these latter variants is sometimes known as the **BA-10M**. This first appeared in 1937 and used the turret of the T-26B light tank with its 45-mm (1.77-in) gun. This was not the only tank turret so used, for others known to have been fitted were the turret of the experimental T-30 light tank and that of the BT-3 tank. One odd variation of the BA-10 that appeared in 1932 was the **BAZ** amphibious vehicle, which used the basic BA-10 hull allied to a flotation body derived from contemporary German experimental vehicles. Only a few were produced.

When the Germans invaded the Soviet Union in 1941 the BA-10 and its later derivatives were in service in some numbers with the Red Army, the number 1,200 often being quoted. However, the events of 1941 and 1942 decimated the numbers of BA-10s, and large numbers fell into German hands. The Germans found them to be serviceable vehicles, although they considered them not really modern or mobile enough for use with their Panzer units, and kept them for use with anti-partisan units both in the Soviet Union and in the Balkans. The Germans knew the BA-10 as the **Panzerspähwagen BAF 203(r)**; some of their reports mention the vehicle as a Ford.

After 1942 the Soviets started to phase out the use of heavy armoured cars such as the BA-10. Those that remained were often relegated to the armoured personnel carrier role, having their turrets removed and the interiors stripped of all equipment other than the driver's seat and controls.

Specification

BA-10M

Crew: 4

Dimensions: length 4.70 m (15 ft 5 in); width 2.09 m (6 ft 10½ in); height 2.42 m (7 ft 11¼ in)

Powerplant: one GAZ-M-1 4-cylinder water-cooled petrol engine developing 85 hp (63 kW)

Performance: maximum speed 87 km/h (54 mph); maximum range 320 km (199 miles)

Egypt

The Egyptian armed forces are numerically not the largest in the Middle East but they are one of the most powerful in weapon power and ability. They are currently in a period of transition, the third in recent decades. Originally the Egyptian armed forces were modelled along British lines and used mainly British equipment. That changed when Egypt moved into the Soviet sphere of influence and, although that period ended even before the peace agreements with Israel, the nation is now entering a period of American influence, in politics, economics and military equipment and training.

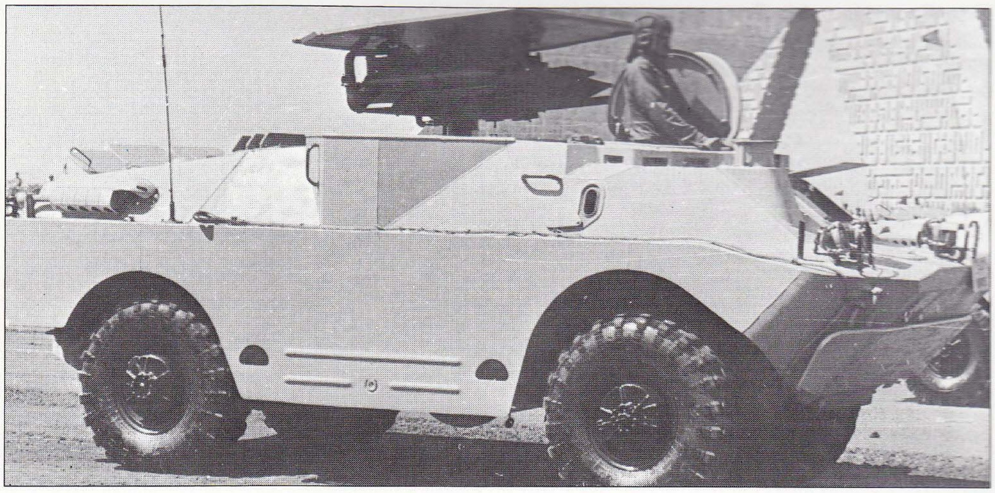
Thus the Egyptian armed forces are currently in a state where much of their equipment is of Soviet origin but is rapidly becoming less and less effective through lack of spares and other back-up following the split with the Soviet bloc. American equipment is now becoming available, but the supply of this new material has not been as rapid as was first hoped, and it will be some time before the necessary retraining is complete.

The Egyptian Army

Of all the Egyptian armed forces the army is the strongest in numbers and influence. It has a force at any one time of about 315,000 of whom 180,000 are conscripts serving for a selective three-year period. Reserves amount to about 300,000.

Much of the army's equipment is currently ex-Soviet but some local manufacture of weapons is planned and in some cases is under way. Light vehicles such as Jeeps and trucks are manufactured within Egypt, and there are plans for an electro-optics industry, a heavy trucks industry and other such facilities. But for the time being much of the current equipment remains ex-Soviet. Some American equipment is now arriving and more is on order, and there is even a fair amount of ex-British material still in use with the reserves.

Built in Britain by Vosper Thorneycroft, the 'Ramadan' class fast patrol craft are armed with four Otomat missiles, 50-km (32-mile) range anti-shipping weapons. Air defence is provided by a single 76-mm and twin 40-mm guns.



The Egyptian army is largely Soviet-supplied, and some of their reconnaissance vehicles such as this BRDM-2 (seen on parade in Cairo) have a secondary anti-tank capacity using AT-3 'Sagger' missiles.

One of the main problems for the Egyptian Army is the sheer number of equipment types in use. To quote one example, the artillery, there are no less than 13 types of guns in service with calibres ranging from 85 mm to 180 mm (3.35 in to 7.09 in), and to these must be added three types of heavy mortar, five types of multiple rocket-launcher and some heavy artillery rockets. Such a logistic mix is not safe, even when operating from within closed borders, and the Egyptian Army is operating away from its home base quite often.

Egyptian troops are currently serving in Iraq as 'volunteers' with the Iraqi army in its war with Iran. Egyptian soldiers also serve in the Sudan and from time to time in Oman and Zaire. Egyptian military advisers also serve with many Arab states, but recent agreements with Israel have made Egypt rather unpopular in the region and an Egyptian presence is often disguised.

The main striking force of the Egyptian Army now rests with its three armoured divisions, each of which has one armoured brigade and two mechanized brigades. These are followed up by five mechanized infantry divisions, each of which has a sizable tank element (one armoured brigade to two mechanized brigades). The infantry's main strength is in the three infantry divisions, each with two infantry and one mechanized brigade. The bulk of these main formations is no longer in the Sinai looking towards Israel (although some units are still maintained there) but in the Western Desert arrayed against Libya.

The elite of the Egyptian Army is contained in two formations, the Airborne Brigade and the two Republican Guard Brigades. Both are now receiving training from American advisers. Another highly effective force is made up by two airmobile brigades.

To back them up there are no fewer than 12 artillery brigades and, an unusual feature in armies outside the Soviet bloc, two heavy mortar brigades. Missiles, both artillery and anti-aircraft, abound in the formations, in six anti-tank brigades and two SSM brigades (one with 12 FROG-7s and the other with 12 'Scud-Bs'.

The bulk of the Egyptian armour is made up of a force of 860 T-54 and T-55 tanks with a further 600 or so T-62s. Appreciable numbers (about 250) of American M60A3s (known locally as AM-60s) are now in service and 190 more are on order. These are backed up by the usual array of Warsaw Pact reconnaissance vehicles (BRDM-1 and BRDM-2) and APCs (some 200 BMP-1s and 2,500 others), but these are now being augmented by large numbers of American M113s (300 delivered and 750 on order). When the current orders are delivered the Egyptians will have over 1000 M113s in service, and to these must be added mortar carriers and the other such vehicles based on the M113 chassis.

The artillery arm is also undergoing change. The present plethora of calibres (amounting to some 1,500 Soviet equipments) will be replaced by a core of 155-mm (6.1-in) M109A2 self-propelled howitzers, and the anti-tank guns will be replaced by 105-mm (4.13-in) tank guns on West German tank destroyer chassis. New anti-tank missiles are also on the way: 4,000 of them will be TOW (1,500 standard TOW and 2,500 Improved TOW) and 2,000 of them will be British Swingfire missiles. (Swingfire is already in service, along with some TOWs.)

AA defence, currently centred on SA-7 and SA-9 SAMs and complemented by some 350 ZSU-23-4 and ZSU-57-2 self-propelled guns, is being bolstered by the introduction of a planned 20 Crotale systems and Skyguard twin 35-mm cannon.

The Egyptian Navy

The Egyptian Navy has its main bases at Alexandria, Port Said, Port Tewfiq, Mersa Matruh, Safaqa and Hurghada. It is primarily a coastal defence force, equipped mainly with destroyers, frigates and fast attack craft. The principal offensive force is the 12 submarines in service, two of them ex-Chinese and the rest ex-Soviet. Most of the surface vessels are also ex-Soviet bloc, but the force of five frigates includes two Spanish-built vessels and three ex-British vessels, one of them acting as a submarine support ship. Out of a force of 24 missile-armed fast attack craft half are British-built and the rest ex-Soviet, and six more FAC(M)s are on order. Hovercraft are extensively used: three SRN-6s are already in use, sometimes for minelaying, and another 14 are on order. The rest of the strength is made up from ex-Soviet minesweepers, patrol craft and landing craft.

The navy also has one squadron of Westland Sea King Mk 47s in use in the anti-submarine role, and as the navy also has a coastal-defence responsibility there are batteries of 130-mm (5.1-in) guns and a mix of Otomat and 'Samlet' anti-ship missiles based around the coast. Current manpower strength is 20,000 (including 15,000 conscripts), and there are 15,000 reservists.

Since the inception of exercises such as 'Bright Star 82', it has become possible for such disparate aircraft types as the MiG-15 trainer, MiG-21, F-16 and the A-10 to be seen together over the pyramids.

The Egyptian Air Force

The Egyptian Air Force is one of the most powerful of all Arab air forces and is equipped with a bewildering mixture of aircraft types. On paper the air force has a strength of well over 500 aircraft, some of them helicopters, but many of these are ex-Soviet and now lack spares, and so are due for replacement by Western types or from sources less liable to impose sanctions. Some 10,000 conscripts are included in a manpower strength of 27,000, and there are some 20,000 reservists.

In striking power the Egyptians air force is one of the few in the region with strategic capacity. For this it has a small force of 14 Tupolev Tu-16 'Badger' bombers, some of which are used in a maritime patrol role. A few AS-1 'Kennel' and AS-5 'Kelt' air-to-surface missiles are available to the 'Badger' force. To back up this small force there is now an array of aircraft types mostly allocated to fighter/ground-attack regiments. Most of these are the usual Warsaw Pact fighter and strike types together with a number of their Chinese derivatives. There is also a small force of 53 Dassault-Breguet Mirage 5s, and six Mirages are also used to equip part of two reconnaissance squadrons. Transport aircraft reflect once again the Western/Soviet influences by the use of both the Lockheed C-130 Hercules (21 out of 27 planned) and such types as 18 Ilyushin Il-14s and 10 Antonov An-12. What must be some of the last Ilyushin Il-28 'Beagle' bombers in service anywhere are used to equip a small maritime reconnaissance squadron (five aircraft).

Helicopter squadrons are some 12 in number and include 108 Aérospatiale Gazelles (24 with HOT anti-tank missiles) with another 36 (24 with HOT) on order, 25 Westland Commandos, 15 Boeing Vertol Chinooks (with 15 more on order) along with 20 Mil Mi-4s and 40 Mi-8s. A VIP transport unit operates four Dassault-Breguet Falcon 20s, one Boeing 707, one Boeing 737 and two of the Westland Commandos. There is also a 10-strong squadron of de Havilland Canada DHC-5D Buffalos.

On order is a whole array of new equipment ranging from 100 Chinese F-7s (MiG-21s) to 20 General Dynamics F-16s, complementing 20 already in service. Some 20 Dassault-Breguet Mirage 2000s and 16 more Mirage 5s are also on order, and the American influence can be seen in the ordering of more C-130s and 24 Bell AH-1 Cobra helicopters. Some 35 Dassault-Breguet/Dornier Alpha Jets are also on the way (supplementing 10 already in service) as well as Aérospatiale Super Pumas and 12 Westland Sea Kings. An innovation, when they arrive, will be four Grumman E-2C AEW aircraft, which will supplement the existing force of two Lockheed EC-130H Elint aircraft.

The Egyptian Air Defence Command

Egypt has much of its population and industrial potential in a small area strung along the River Nile. It also has long borders, so the establishment of an Air Defence Command apart from the other three services was seen as a recent operational priority. It is still being established by the construction of 12 operations centres around the country. When complete these will control 85,000 men (50,000 of them conscripts) in two divisions. These two divisions will control about 100 missile and anti-aircraft gun battalions armed with guns with calibres from 20 mm to 100 mm, and missiles including mainly Soviet type such as 360 SA-2s, 200 SA-3s, 75 SA-6s and six American Improved HAWK missiles.

The Air Defence Command also control three interceptor aircraft brigades. At present these are formed from seven MiG-21 squadrons (142 aircraft) but there will be more squadrons equipped with 40 F-16s and 54 Mirage 5s currently on order. Many of the existing ex-Soviet radars in service will be replaced by American and Chinese equipments, and 216 Improved HAWKs are in the pipeline.

Order of Battle

Army

three armoured divisions
five mechanized infantry brigades
three infantry divisions
two Republican guard brigades
two airmobile brigades
one parachute brigade
two independent armoured brigades
nine independent infantry brigades
12 artillery brigades
two heavy mortar brigades
six artillery missile regiments
two artillery missile regiments
seven commando groups

Navy

six 'Romeo' class submarines
six 'Whiskey' class submarines
five 'Skory' class destroyers
one 'Z' class destroyer
two 'Descubierta' class frigates
one 'Black Swan' class frigate
one 'Hunt' class frigate
one 'River' class frigate/submarine support ship
24 missile-armed fast attack craft (six more on order)
12 large patrol craft
30 fast attack craft (14 torpedo- and 16 gun-armed)
12 minesweepers (10 ocean and two inshore)
16 landing craft (13 utility and three tank)
three hovercraft (14 more on order)
one ASW Sea King squadron
coastal defence batteries

Air Force

one bomber regiment (Tu-16)
five fighter/ground-attack regiments (F-16, F-6, MiG-17F, Su-7BM and Mirage 5SDE2)
one maritime reconnaissance squadron (Il-28)
two reconnaissance squadrons (Mirage 5SDR, MiG-21R, MiG-21RF and Su-7)
one transport brigade of five squadrons (C-130H, Il-14, An-12, DHC-5D Buffalo, Falcon 20, Boeing 707 and Boeing 727)
one Elint unit (EC-130H)
12 helicopter squadrons (SA 342H and SA 342K Gazelle, Commando, CH-47C, Mi-4 and Mi-8)
training units (MiG-15UTI, MiG-21U, MiG-21US, Alpha Jet E, Aero L-29, F-16B, Mirage 5SDD, Helwan Gomhouria, Yakovlev Yak-18, PZL Wilga, FT-6)

Air Defence Command

12 operations centres (under construction)
100 battalions (SA-2, SA-3, SA-6, Improved HAWK and Crotale SAMs, and 20-mm, 23-mm, 37-mm 40-mm, 57-mm, 85-mm and 100-mm guns)
three interceptor brigades of seven squadrons (MiG-21F, MiG-21PFS, MiG-21FL, MiG-21PFM, MiG-21M and MiG-21MF) and two more forming (F-16A and Mirage 5SDE1)

Egypt's Air Defence Command possesses a potent mix of gun and missile weapons. The Soviet-supplied SA-6 'Gainful' missile gave the Israeli air force a shock during the Yom Kippur war, being both capable and mobile.